

Towards a Solution for the Hold-Out Problem: Restoring “Balance” in the Licensing of Cellular SEPs¹

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I. INTRODUCTION AND SUMMARY

The interpretation of the FRAND commitment contained in ETSI’s IPR policy is at the heart of litigation between holders of standards essential patents (“SEP holders” or “upstream innovators” or “licensors” in this paper) and firms that sell products that implement cellular mobile technology (“implementers” or “licensees”).² The FRAND commitment is often wrongly interpreted as a commitment that SEP holders make to the standards development organisation (“SDO”, in this case, ETSI) to license all comers on fair, reasonable and non-discriminatory (FRAND) terms.³ In fact, ETSI’s IPR policy only requires that SEP holders provide ETSI with a commitment that they are prepared to grant irrevocable licenses on FRAND terms and conditions. Further, this particular part of ETSI’s IPR policy exists within a broader over-arching policy objective to secure a “balance” between the interests of SEP holders and downstream implementers. In this context, an open-ended interpretation of the FRAND commitment—namely that its role is to protect and benefit implementers with no regard to the implementer’s conduct—is not only a misinterpretation of the actual requirements imposed on the licensor, but (more importantly) runs contrary to the objective of ETSI’s IPR policy.

These issues around the meaning and intent of the FRAND commitment are of great practical interest given the increasing attention to the problem of “hold-out” behaviour by licensees. When SEP-related disputes in cellular telephony first burst into prominence in the mid-2000s, the prevalent focus among academics and among antitrust agencies was on the theoretical problem of “hold-up”—i.e., the SEP holder’s potential ability to extract supra-FRAND rates arising by virtue of the threat of excluding the implementer from practising not just its SEPs but the standard itself. This theory of hold-up⁴ always overlooked the non-self-enforcing nature of patents, but makes particularly little sense now given that the legal and policy climates around enforcement of patent rights have shifted against patent holders in recent years (particularly in the US). In this context, hold-out—

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² The historic focus of licensing has been on handset and smartphone manufacturers, but there is an increasing range of products, from IoT modules to wearables and laptops, that are also now cellular-enabled. Our discussion applies to the licensing of all such cellular-enabled products. However, as much of the available evidence base and theoretical discussion around the licensing of cellular SEPs pertains to smartphones, we use that term in the rest of the paper, for ease of expression.

³ For example, a news report describing the change in stance towards SEPs of the Biden Administration relative to the Trump Administration stated that “Companies that are part of developing industry standards commit to license patents that are essential for those standards on terms that are ‘fair, reasonable and non-discriminatory.’” See Bloomberg Law (2021), “Biden Signals Shift Toward Tech on Standard Essential Patents”, available at <https://news.bloomberglaw.com/ip-law/biden-signals-shift-toward-tech-on-standard-essential-patents>.

⁴ As we explain, the term “hold up” has been misapplied in the context of SEP licensing.

the ability of implementers to resist taking a license for a prolonged period of time, or only take a license on terms that might well constitute “reverse hold-up”— is a much more likely problem than hold-up.

In our experience, many SEP holders must spend years and devote extensive resources to negotiation before they are able to achieve a license with implementers, or else resort to litigation—litigation that carries asymmetric risks for SEP holders, as discussed below— before they are able to obtain any value from the implementer for its use of the SEP holder’s patents. In the meantime, implementers can make full use of the SEPs, given the open nature of the standards. Further, the failure to achieve licenses with individual licensees may have negative consequences for the SEP holder’s broader licensing efforts. Additionally, through delaying taking a license, licensees may be able to extract significantly lower rates for past use, benefit from statutes of limitations on past damages, and also benefit from potential expiry of patents that they have infringed for many years. If the very worst outcome for an infringer is that ultimately it ends up paying a FRAND rate on only some portion of its infringing sales⁵, it will have a great deal of bargaining power to bring to negotiations with SEP holders, and infringement and hold-out will usually be profitable strategies.

There is thus an urgent need to restore the idea of “balance” in SEP licensing in the cellular mobile sector. One obvious lever is to strengthen the existing injunctive relief regimes, in order to provide the licensee with stronger incentives to negotiate a license. However, changes to the availability of injunctive relief may be practically difficult to achieve. In this context, FRAND royalty determinations in litigations may play an important restorative role too. Critical to this endeavour of restoring balance is the recognition that infringement and hold-out must not be profitable (and, in fact, ought to be penalized). In this context, (especially) recalcitrant licensees must not be put on the same footing as those who were (more) willing to sign up for licenses on FRAND terms.⁶

An important question that should be addressed is whether an “unwilling licensee”—one that is not prepared to accept any license terms other than those that it subjectively deems to be FRAND—should lose the benefit of the licensor’s FRAND commitment. This not only would/could mean that injunctive relief should be immediate from the moment that the licensee’s unwillingness is established—as the U.K. courts have now recognised in a recent decision involving Apple and Optis, and as has been common in Germany and the Netherlands—but it also potentially means that royalty rates in damages awards against unwilling licensees need not be based on assuming that the FRAND constraint applies. Inherently, a FRAND royalty rate is one that is reasonably linked to the (likely) value

⁵ This is because statutes of limitations may make it impossible to collect on all past infringement.

⁶ In practice, there is an element of hold-out built into many negotiated licenses too. This is because most of these licenses are negotiated some years after infringement began, and often after the threat of litigation has entered the picture. In these circumstances, as we describe at length in the paper, the licensee often has a great deal of bargaining power and can extract lower rates, possibly even “sub-FRAND” ones. Thus, many putative licensees—and perhaps especially larger implementers with ample resources available for litigation—will seek to delay, and thus one might hesitate to label them as truly “willing.”

contribution of the technology to the product. However, as we discuss below, hold-out exerts other costs on the licensor, especially on its overall licensing program. Damages awards linked solely to the value contributed to the product may not suffice to restore the licensor's economic position to where it would have been absent the infringing behaviour. Nor would they truly address the harm to the licensing marketplace that hold-out behaviour inflicts.

However, even if punitive or exemplary damages and enhanced injunctive relief are ambitious and unlikely steps, there are less radical measures that Courts can and should take to recognise the distinction between willing and unwilling licensees.⁷ One important and constructive step concerns the use of the licensor's existing licenses or other parameters of a licensor's existing licensing program in evaluating FRAND rates to apply to infringers who have compelled litigation. The key consideration is that, even in any given licensing situation between a given licensor and a given licensee, a range of rates⁸ may be consistent with meeting the "balance" envisioned in FRAND. The theoretical upper bound for this FRAND range is, as we explain later, based on the value contribution⁹ that the technology makes to the product, which we refer to as a "FRAND benchmark rate."

In practice, many licensees will obtain rates that are well below the top end of this FRAND range, often because the licensor will be prepared to accept rates well within the FRAND range in order to achieve (relatively) quick settlement and avoid litigation.¹⁰ It would be

⁷ We note that in practice, many licensees will delay negotiations and put the licensor in a situation where it may contemplate or even commence litigation, before a license is signed. Licensees' ability to delay confers further bargaining power on them. Even if the parties are able to ultimately negotiate an agreement, this is likely to be on terms that favour the licensee, and which are possibly outside the "FRAND range" discussed above.

⁸ Here, "rates" is used as a short-hand for terms of agreement, including non-price terms. The idea of the FRAND range is related to the idea of a bargaining range, which is widely used in determining reasonable royalties in patent litigation. In a typical license negotiation, the bargaining range is between the licensee's maximum willingness-to-pay and the licensor's minimum willingness-to-accept. The maximum willingness to pay is typically the value contribution (typically expressed in terms of incremental profit gain relative to making an otherwise identical product that does not use the technology) that the licensed technology makes to the product. The minimal willingness to accept would normally be the (very low) short-run incremental costs associated with making the license available (although licensors would typically also factor in the impact on their broader licensing program and might therefore resist accepting very low royalty rates). This bargaining range indicates the gains from trade or the "size of the pie" that is available to be split between licensor and licensee. In the case of ETSI SEP with an attendant FRAND commitment, however, there is also the issue of "balance." There may be some divisions of the pie that—while they might be acceptable in the short-run—might be inconsistent with providing long-run "balanced" incentives to both sides. For example, if the licensor or licensee appropriate all the gains from trade this might be inconsistent with the idea of balanced incentives. As a result, one might think of a "FRAND range", as a subset of the overall bargaining range, with all points within this subset being consistent with the "FRAND" balance.

⁹ As discussed later in this paper, this value contribution should be allowed to reflect the value that the technology offers as part of a standard. Thus, our view of the value contribution should be distinguished from the concept of ex-ante incremental value, as offered in, for example, Swanson, Daniel and William J. Baumol (2005), "Reasonable and Nondiscriminatory (RAND) Royalties, Standard Selection, and Control of Market Power", *Antitrust Law Journal*, Volume 73, Number 1, pp. 1-58.

¹⁰ Licensees' ability to delay agreeing to a license gives them significant bargaining power. For example, dragging out discussions means that a greater fraction of a licensee's use of the relevant technology is in the past, and thus the threat of an injunction is less potent. Further, licensees and licensors alike will recognise that what a licensor can collect by way of damages in litigation is typically limited by statutes of limitation. Of course, most fundamentally, licensors' only alternative to negotiation is litigation, whereas the licensee enjoys use of the technology until and unless it is enjoined. Litigation entails asymmetric risks for the licensor too, as we discuss below.

wrong for Courts to base rates for infringers on these negotiated rates without recognising the context in which these rates were achieved and thereby putting the unwilling on the same footing as the willing. Instead, court-awarded rates (whether applied to licenses or past use damages) should at a minimum be based on the FRAND benchmark rate. However, one will in practice have to proxy this FRAND benchmark rate from licenses negotiated in the marketplace. In practical terms, then, this will mean a rate that is based on the top end of the range of rates that a licensor has negotiated with other licensees. This is, of course, a minimalist corrective action for the problem of hold-out.

Further, we stress that the non-discrimination or “ND” prong of FRAND should not be invoked as a reason to base awards either based on “best prices” or even averages across licensees—the ND prong cannot be interpreted in such a way that non-discrimination trumps the fundamental idea of balance. The comparison of royalty rates achieved by different licensees is relevant for an ND analysis to the extent that differences in royalty rates results in a “distortion of competition”¹¹—if two licensees operate very different business models and aim at very different market segments, then any distortion of competition is unlikely.¹² Royalty rates paid to individual licensors are a small sliver of the implement’s overall cost stack, and so differences in these rates paid are unlikely to distort competition.¹³

In recent litigation in the United Kingdom, the issue of the scope of FRAND (i.e., when is a putative licensee entitled to the protection of the FRAND commitment) versus the overarching goal of balance in the ETSI IPR policy has come into sharp focus. In particular, Mr. Justice Meade in *Optis v Apple* agreed that if a licensee has indicated that it is not willing to commit to accepting FRAND terms determined by a Court, an injunction should

¹¹ We view the “ND” prong of FRAND through the lens of ETSI’s IPR policy, and its underlying economic goals, rather than through the lens of antitrust law. However, we think that the “distortion of competition” concept used by the U.K. Court in *Unwired Planet*, which draws from (European) competition law, is a useful rubric that reflects a useful analytical approach to take to the issue of non-discrimination. The Court in *Unwired Planet* referred to an effects-based framework. The first step in this framework requires establishing that differences in royalty rates across different licensees actually have an impact on competition between these licensees, and that this impact translates into an adverse impact on competition in the downstream market, i.e., it reduces output in the downstream market. What we would add, however, is that the relevant analysis needs to focus on *long-run* output and welfare, consistent with what we see as ETSI’s focus on the health of the ecosystem built around its standards. By contrast, hard-edged interpretations of non-discrimination preclude examination of economic effects. In the effects-based paradigm, differences in royalty rates (that are within the FRAND range) across different licensees or groups of licensees would only matter if these differences harmed competition and the competitive process (which, at least taking a long-run perspective, is synonymous with harm to the ecosystem built around the standard.

¹² In *TCL v Ericsson*, one of us (David Teece) offered the concept of “strategic groups” of firms as a useful practical way to evaluate the ND issue. Under this approach, only firms in the same strategic group should be seen as “similarly situated” for the purposes of an ND analysis, with the closeness of competition between firms as well as their competitive and geographic foci determining whether or not they were in the same strategic group. In a somewhat similar, if more econometric, spirit, one might look at diversion ratios and cross-price elasticities between firms to evaluate the closeness of competition and thus the relevance of any royalty rate differentials between different firms. Of course, to ultimately accept any claim that alleged discrimination actually falls afoul of what was intended by ETSI’s IPR policy requires showing that this discrimination negatively effects the ecosystem built around the standard (consistent with the note above).

¹³ Further, many negotiated licenses involve lump sum payments, which do not affect marginal pricing and production decisions. Indeed, differences of a few million dollars, paid in a lump sum, for licenses that cover many years of use, are unlikely to materially affect forward-looking pricing, production and market participation decisions.

apply immediately unless the licensee commits unconditionally to taking a license on FRAND terms (as determined by a Court). However, the Court rejected the idea that Apple (or any other infringer in the same position) should permanently lose its right to a FRAND license given its demonstrated unwillingness. However, we think that given the broader harm to the licensor and indeed to the wider marketplace that holdout behaviour creates, it is still problematic to keep the option of a FRAND license open indefinitely for an unwilling licensee.

The remainder of this paper spells out some key economic considerations that must inform FRAND decision-making. In particular, we note three things: (a) the concept of “balance” that is an over-arching goal of ETSI’s IPR policy; (b) how this concept should inform the understanding of the scope of the FRAND commitment; and (c) the problem of hold-out, which is driven by a combination of weakened injunctive relief and the inherently non-self-enforcing nature of patent rights. We find that the historical policy focus on “hold up” of implementers by SEP holders rather than “hold-out” against SEP holders has been seriously misplaced. Whereas the actual royalties paid by implementers are a small share of their total revenues, they are the only way in which non-vertically-integrated upstream innovators can monetize their innovation. Providing adequate incentives for such upstream innovation is a problem that has been recognized by some scholars of innovation for decades, but it has largely been ignored in the practice of economic policy towards SEPs.

II. SCOPE OF THE FRAND COMMITMENT

In this section, we discuss (a) the wording of the FRAND commitment and its implication; and (b) the economic and policy context that must inform the interpretation of the wording. In particular, we focus on the issue of whether the FRAND commitment is intended to serve only as protection for implementers, and whether this protection for implementers is circumscribed in any way. Exactly such issues were aired in the *Optis v Apple* proceedings in the United Kingdom, where Mr. Justice Meade had to consider the issue of whether the FRAND obligation confers a benefit without a corresponding burden, which he identified as the burden of taking a license.¹⁴ Our goal here is to provide economic context that illuminates this issue.

The ETSI IPR Policy at 6.1 states:

When an ESSENTIAL IPR...is brought to the attention of ETSI, the Director-General of ETSI shall immediately request the owner to give... an irrevocable undertaking...that it is prepared to grant irrevocable licenses on...(FRAND) terms and conditions.

The ETSI IPR policy further states:

¹⁴ Paragraph 279 of the judgment of Meade J in *Optis Cellar Technology LLC v Apple Retail UK Limited* [2021] EWCJC 2564 (Pat) (“Apple v Optis.”)

The above undertaking may be made subject to the condition that those who seek licenses agree to reciprocate.

The SEP holder who makes this commitment must be prepared to grant licenses on FRAND terms—no more than this. There is certainly no express requirement to conclude licenses on FRAND terms with all comers. Further, this preparedness to grant licenses on FRAND terms can be made conditional on reciprocity by those who seek licenses, although the reference to reciprocity may primarily refer to situations of cross-licensing—in the early days of cellular standards, such cross-licensing between vertically integrated firms would have been the standard mode of licensing.^{15 16}

The substantive issue around “reciprocity”, however, concerns the obligation or “burden” (in the word used by the English court in *Optis v Apple*) on any license seeker—regardless of whether cross-licenses are involved—to accept a license on FRAND terms. In our view, regardless of the wording of Section 6.1, for the FRAND requirement to sensibly co-exist with ETSI’s broader goals, there clearly is some reciprocity or burden on the licensee too. This is supported by ETSI’s statements in relation to what a potential licensee should do prior to licensing or implementing SEPs.¹⁷

It should not be controversial that there is some burden attached to the licensee as well. After all, the EU’s framework for assessing injunctive relief in SEP cases, the so-called Huawei-ZTE framework, places the licensee’s willingness to accept FRAND terms at the heart of the framework— it would be considered an abuse of dominant position under EC competition law for the licensor to seek an injunction against a willing licensee, but if the licensee were unwilling, then injunctive relief can be an appropriate remedy against an infringer.¹⁸ (The Huawei-ZTE framework was developed in the context of a referral to the European Court of Justice (ECJ) by the Dusseldorf Regional Court in relation to a dispute between Huawei and ZTE, in which Huawei had sought an injunction against ZTE related to infringement of SEPs. The ECJ clarified the safe harbor conditions under which a SEP holder may seek injunctive relief. It spelled out the obligations of the licensor as well as the licensee. Of particular interest to our current article, it places a burden on the licensee to demonstrate its willingness to accept a license on FRAND terms, and to respond diligently to offers that the licensor has made to it).

¹⁵ “Vertical integration” in this context means that the firms were both SEP holders and implementers.

¹⁶ One might also consider the implications of the term “prepared.” One could interpret the term “prepared” as requiring that the licensor is more than just notionally amenable to reaching agreements on FRAND terms, but that it has or will put in place the resources required (or offers a reasonable mechanism) to facilitate the licensing of its SEPs.

¹⁷ In fact, one could argue that ETSI not only envisages reciprocity as outlined above, but a pro-active duty on licensees to seek licenses before they implement SEPs. For example, ETSI says that “Prior to making a patent licensing decision and implementing any SEP contained in the ETSI IPR Database, potential licensees shall always contact the declarant.” See <https://www.etsi.org/intellectual-property-rights>.

¹⁸ The English Court’s ruling in *Optis v Apple* actually brings it into line with EU practice, as seen in countries such as Germany and the Netherlands. Under this ruling, an injunction can take effect before the Court determines FRAND terms, as long as the licensee’s unwillingness to accept a FRAND license is apparent. Under the *Unwired Planet* framework, an injunction was only available as an alternative to a FRAND license.

What has been much less discussed is whether the unwilling licensee should be able to obtain a license on FRAND terms at all. In *Apple v Optis*, the Court declined to go so far as to say that Apple—whose unwillingness had been established because it had declined to commit to accepting court-determined FRAND terms—had forfeited its right to a subsequent FRAND license. In our view, as long as the option to avail of FRAND terms continues to be on the table, the licensee’s incentive to take a license—especially to do so relatively swiftly—will, in many cases¹⁹, be too weak to restore the “balance” that is at the heart of ETSI’s IPR policy.

In the next section, we discuss this idea of “balance”, and explain that it is not merely an institutional goal of ETSI’s IPR policy, but has a sound economic basis too. Once we have established the salience of “balance”, we explain why hold-out rather than hold-up is the much likelier threat to achieving this balance. This enables us to explain why strong measures are required to address hold-up and restore balance—and thus why strengthening the cudgel of injunctive relief and/or addressing the basis on which courts make license and damage awards is crucial.

III. ETSI STANDARDS AND “BALANCE”

The economics of the FRAND commitment—what constitutes “reasonable” and “non-discriminatory” terms and conditions— are necessarily understood with reference to the objectives of ETSI’s IPR Policy and the objectives of standardization.

A foremost consideration—and one which ETSI’s IPR Policy most definitely reflects—is the need for FRAND royalty rates to foster and sustain the development of a robust “innovation ecosystem” for development and implementation of improved mobile communications. A robust innovation ecosystem requires that all categories of participants are incentivized to work together to create commercial outcomes that are robust over time. In particular, we note that if royalty rates are too low or patent enforcement is weakened significantly, the “open innovation” model will suffer. Instead, innovation will be done “in house” by vertically integrated firms such as Huawei, Apple or Samsung. One potential result could be to take the market back to the days of GSM technology when vertically

¹⁹ For example, the option of holding out is especially attractive and especially feasible for large, well-resourced firms that can drive SEP holders to a position where their options are either costly, uncertain and asymmetrically risky litigation; or to a license on terms that are inconsistent with FRAND but which a licensor might accept because they at least provide some revenues for use of the technology by an implementer that has otherwise engaged in long-term hold-out.

integrated firms could use SEPs to impede entry.²⁰ ²¹ Another consequence might be that vertically-integrated firms are likely to focus on innovations which are of the greatest private benefit to their downstream arms, and thus the focus of their innovation activities will be on proprietary technologies and not on open standards. The successful standardization seen to date might well suffer as a result, as a great deal of valuable innovation in ETSI standards is provided by non-vertically-integrated firms.²²

ETSI standards provide the benefits of compatibility and interoperability that are associated with standardization. These conventional standardization-related benefits are, of course, substantial: interoperability between handsets and IoT devices and cellular networks enables mobile network operators, manufacturers of mobile devices and developers of applications and software on those devices to benefit from global economies of scale. Further, it is well recognized in economics that standardization facilitates network effects—the phenomenon by which the value of a technology increases as the installed base of users of that technology increases. This enables diffusion of technology at a faster rate than would be achieved in a world without standards.

However, it is critically important to also recognize that ETSI standards facilitate the improvement of mobile and IoT devices and networks in critical dimensions such as upload and download speeds, power management, network capacity and latency. Most significantly, standardization provides the focal point for coordinating the development and introduction of new communications technologies, via their definition and selection for inclusion in new standards. In turn, these ever-improving devices and networks create new opportunities for applications and uses—the growing use of cellular connectivity to

²⁰During the 2G era, vertically integrated firms that held the majority of IPRs, could cross-licence each other and thus pay very little net royalty, while others who lacked their own IPRs, suffered from a substantial cost asymmetry. Bekkers Rudi, Bart Verspagen and Jan Smits (2002), “Intellectual Property Rights and Standardization: the case of GSM”, *Telecommunications Policy*, Volume 26, at pp.171-188. See p.182. By contrast, while vertically separated upstream firms may have incentives to charge high prices, they do not have the exclusionary incentives that vertically integrated firms may have, and so one would expect that the emergence of substantial IPR owners who are not vertically integrated would reduce the problem of exclusion and create a more level playing field. We observe that in the 3G and 4G era, Nokia and Ericsson were—despite their strong position in SEPs—unable to maintain their downstream market position (in handsets, at least).

²¹ For a discussion of the open innovation model in SEPs, see Teece, David J. (2018a), “Enabling Technology, Social Returns to Innovation, and Antitrust: The Tragedy of Depressed Royalties”, *CPI Antitrust Chronicle* (June), pp.40-50, and also Teece, David J (2018b), “Profiting from Innovation in the Digital Economy: Enabling Technologies, Standards and Licensing Models in the Wireless World”, *Research Policy*, Volume 47, Number 8, pp. 1367-1387. See also, Teece, David J. (2021), “Technological Leadership and 5G Patent Portfolios: Guiding Strategic Policy and Licensing Decisions”, *California Management Review*, Volume 63, Number 3, pp. 5-34, for a discussion of “open innovation” in the context of the emerging 5G ecosystem.

²² Of course, there may be contexts in which vertical integration supports innovation, e.g., because it can be used to mitigate the hold-up problem (i.e., the risk that opportunistic conduct by a counterparty facilitates the expropriation of the innovator’s sunk investment) or to increase the appropriability to the innovation (i.e., because the vertically integrated firm has a downstream division that is closer to the customer and the final product, it may be in a better position to extract some of the ultimate value or social surplus generated by the innovation and products that incorporate it). In the context of ETSI SEPs, the “balance” sought by the IPR policy that we discuss below, is designed to mitigate symmetrically against hold-up problems (including hold-up of licensors by licensees), thus facilitating participation by upstream firms that are not vertically integrated too. If this balance is maintained, i.e., the “FRAND” regime functions robustly, then the benefits of openness might dwarf those of vertical integration. A wide range of upstream actors with a wide range of capabilities can contribute to the standard, and an equally wide range of actors downstream can access the standardised technology, while the robust FRAND regime also protects putative licensees (including against exclusionary conduct by vertically integrated licensors).

support new IoT use cases provides a particularly good example of this. For instance, the high-speed data capabilities of LTE have progressively facilitated use cases ranging from advanced telematics, to video billboards, to connected cameras, with augmented reality and virtual reality applications on the anvil. But cellular connectivity also supports efficient low-speed data communications, giving rise to a range of applications from telematics, remote maintenance and control, with additional use cases such as logistics, wearables, smart infrastructure and emergency assistance applications emerging over time. All these use cases are set to grow substantially in importance with the advent of 5G.

In short, ETSI standards provide a platform for complementary innovations to occur. ETSI is not merely ratifying interoperability standards. It is selecting and combining the best new technologies advanced by a myriad of parties into an agreed upon constellation of technologies (“the standard”) which will enable the enhanced performance of mobile and devices and services.

For the system to generate rapid innovation and maximum value for consumers, it must provide all necessary players, both technology developers and standards implementers (as well as vertically integrated firms engaged in both developing and implementing standards), with appropriate incentives to invest in fundamental technology while enabling implementers to succeed too. The focus must be on both the generation and adoption of technology; the one without the other will cause the ecosystem to diminish and ultimately fail.²³

ETSI has expressly recognized as much in describing its IP policy objectives:

*It is ETSI’s objective to create STANDARDS and TECHNICAL SPECIFICATIONS that are based on solutions which best meet the technical objectives of the European telecommunications sector. ... In achieving this objective, the ETSI IPR POLICY seeks a balance between the needs of standardization for public use in the field of telecommunications and the rights of the owners of IPRs.*²⁴ [Emphasis added]

In summary, “balance” is a key idea at the core of ETSI’s IPR policy. The FRAND commitment does provide protection to the licensee, but it cannot be interpreted or implemented in such a way that the incentives of the upstream technology developers—the SEP holders or licensors—to participate in future standardization efforts are ignored. Further, economic theory provides good reason for us to think that providing incentives for the upstream technology developers is quite challenging, which means that it might be relatively easy to destroy the sought-after balance (e.g., through making the FRAND commitment more open-ended than it need be, as we discuss later in this document).

²³ Teece, David J. (2012), “Next-Generation Competition: New Concepts for Understanding How Innovation Shapes Competition and Policy in the Digital Economy”, *Journal of Law, Economics and Policy*, Volume 9, Number 1, pp.116-118.

²⁴ ETSI IPR Policy, *supra*, Section 3.1.

The Nobel Laureate Kenneth Arrow noted, as long ago as 1962, the puzzle that “the firm that has developed the knowledge cannot demand a greater share of the resulting profits.”²⁵ ²⁶ A recent study by Padilla, Heiden and Peters (2020), puts this into context. The authors show that SEP licensing revenue amounted to 0.17% of their estimate of the value of the mobile economy.²⁷ These observations suggest that the impact of changes in royalty rates is likely to be of second-order importance for downstream implementers, as they are but a small share of revenues and costs. Thus even a 20% or 30% reduction or increase in royalty costs will have a relatively small effect on final prices, revenues and profits for downstream implementers (e.g., a 20% increase in royalty revenues would increase the share of such revenues from the 0.17% of the mobile economy to just over 0.20%). But the effect on upstream incentives to innovate is likely to be more substantial.

The economic literature on sequential innovation is also consistent with this observation that upstream firms might extract too little of the ultimate economic value that their product generates relative to what is required to align social and private incentives to invest. The sequential innovation literature recognizes that, if anything, it is especially difficult to provide appropriate incentives for the “first-stage” innovator: the pioneer who develops the fundamental (enabling) technology. The fundamental technology may in itself have few direct economic applications; but it may be the building block for a follow-on innovation that has tremendous economic benefit. If the developer of the fundamental pioneering technology were not allowed to share in the value generated by the follow-on innovation it may choose to simply forego the development of the fundamental technology in the first place. The literature suggests that in situations of sequential innovation, such as in the mobile telecommunications sector, there may be a need for particularly strong mechanisms to aid the first-stage innovator’s ability to capture a share of the total value.²⁸

Evidence from the experience of the IEEE, which has instituted a much more prescriptive version of FRAND, aimed at addressing the “hold-up” problem, demonstrates that participation in standards is sensitive to changes in the rule of the game that would impede licensors’ ability to monetise the contributions they make to the standard. IEEE, in 2015

²⁵ Arrow, Kenneth (1962), “Comment on Willard F. Mueller ‘The Origins of the Basic Inventions Underlying Du Pont’s Major Product and Process Innovations, 1920 to 1950’,” in *The Rate and the Direction of Inventive Activity: Economic and Social Factors*, Princeton University Press, p.355. Arrow revisited the subject of licensing 50 years later, and noted again in 2012: “I have the impression that licensing is a minor source of revenues.” Arrow, Kenneth (2012), “The Economics of Inventive Activity Over Fifty Years”, in Lerner, Josh and Scott Stern (eds.), *The Rate and the Direction of Inventive Activity Revisited*, University of Chicago Press, p.47. See Teece (2018a), *supra*.

²⁶ The social value includes the benefits to consumers as a result of being provided value that exceeds the prices that they pay (“consumer surplus”), as well as profits earned by other economic actors in the ecosystem. In the longer-term or “dynamic” context, the social value includes the benefits of new products and follow-on innovations that mobile standards enable.

²⁷ These calculations are based on adding estimated consumer surplus from mobile to an estimate of the value of the mobile economy. Heiden, Bowman, Jorge Padilla and Ruud Peters (2020), “The Value of Standard Essential Patents and the Level of Licensing”, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3717570, at p.4. (Hereafter, “HPP (2020)”).

²⁸ See Green, Jerry R. and Suzanne Scotchmer (1995), “On the Division of Profit in Sequential Innovation”, *RAND Journal of Economics*, Volume 26, Number 1, pp.20-33. In their paper, Scotchmer and Green suggest stronger patent protection (e.g., longer patent lengths) as one means by which to provide greater incentives for first-stage innovation, but the general point they are making is that the “appropriability” problem—the innovator’s inability to capture a substantial share of value—is particularly pronounced where innovation is of a multi-stage nature.

revised its IPR policy in order to give a more specific meaning to FRAND (under that particular IPR policy). In particular, it revised the meaning of “reasonable rate” to exclude the possibility of patent holders receiving any compensation linked to the inclusion of their technology in the standard (an issue discussed below in Section IV). Gupta and Effraimidis (2019) find a significant and swift impact on the incentives of firms to participate in IEEE standards under the new FRAND rules.²⁹

In summary, then, the FRAND commitment cannot be divorced from the larger objective of balance that is sought in the ETSI IPR policy. The economic literature also highlights the problem of incentivising upstream technology innovation. Available evidence from the smartphone sector also suggests that the incentives to develop the fundamental upstream technology for standards are likely to be much more sensitive to changes in royalty rates paid to SEP holders than are the incentives of downstream implementers to add their own innovations. These innate characteristics of sequential innovation are compounded by the ease with which hold-out can occur in the real world, a problem that is made worse by the weakening of injunctive relief. We discuss this next.

IV. HOLD-UP, REVERSE HOLD-UP AND HOLD-OUT

1. The FRAND balance

Given the emphasis on “balance” in the previous section, we think it useful to consider the issues of FRAND royalties, hold-up and hold-out in terms of their consistency with the objective of “balance” between the interests of SEP holders and implementers, which maximises the health of the ecosystem built around ETSI standards.

A useful way to think about FRAND royalty rates is to consider the “surplus” or value-added from the technology as a starting point for a FRAND rate. This surplus reflects the value that the technology adds to the product, e.g., in terms of increased sales, profits, cost savings and the like. In our view, it is entirely appropriate for this surplus to reflect the value that the technology adds as part of a constellation of complementary technologies, i.e., a standard. We note that in *Unwired Planet*, the idea that some portion of this excess value of standardization should go to the SEP holder was not contested by either side’s economist or the Court.³⁰ The Court in *Re: Innovatio* also accepted that “part of the intrinsic value of a technology may precisely be the ease with which it can be

²⁹ Gupta and Effraimidis (2019) conclude in regard to positive and negative Letters of Assurance (“LoAs”) for the 802.11 standards—wherein a technology developer either agrees to license its SEPs under reasonable terms as defined by the SDO (positive), or explicitly declines to provide such an assurance (negative)—“We find that the number of *new* positive LoA submissions has (significantly dropped) by 90%. Interestingly, we also find that (1) the number of submitted negative LoAs reached an all-time high in 2016; and (2) during 2015-18, the number of submitted negative LoAs is larger than the number of submitted *new* positive LoAs. The results suggest that many SEP owners are reluctant to license their patent portfolio on the new FRAND terms.” They add that this has increased uncertainty for implementers too as new standards are being developed against the backdrop of a number of technology owners declining to provide assurances regarding their portfolios, i.e., a “mixed bag” of positive and negative LoAs. Gupta, Kirti and Georgios Effraimidis (2019), “An Empirical Examination of Impact”, *The Antitrust Bulletin*, Volume 64, Number 2, pp. 151-171 at p.156. (Emphases in original, footnotes omitted).

³⁰ *Unwired Planet v. Huawei* at paragraph 97.

adopted into a standard”, i.e., the ease with which it interfaces with other technologies in the standard.³¹

Thus the value added by the technology (possibly including some component of value related to the fact that the technology is part of a standard) is the surplus to be split between the SEP holder and the implementer. A range of ways of splitting the surplus may be acceptably consistent with the idea of “balance” (which is itself not precisely formulated)^{32 33}, and thus FRAND in any given licensing situation may consist of a range of royalty rates.³⁴ Non-FRAND outcomes are defined by situations in which royalty rates are above or below this range.

2. Hold-Up: A theory in search of a problem?

The historic focus of many economists and competition authorities was on the problem of hold-up. In this theory, implementers make sunk investments in standards-related products (Of course, this theory ignores the possibility that implementers can negotiate for royalties before making standard-specific investments. Indeed, ETSI even states that implementers should seek to contact SEP holders *before* implementing SEPs)³⁵. They then negotiate for royalties after these investments are made. The SEP holder can use the threat of an injunction to extract not only the full surplus contributed by the technology, but also to extract value related to the benefits of participating in the marketplace. This is because an injunction will exclude the implementer from implementing the entire standard,

³¹ In re Innovatio IP Ventures LLC Patent Litigation, The United States District Court For The Northern District Of Illinois Eastern Division, “Memorandum Opinion, Findings, Conclusions and Order”, 3 October 2013, 1:11-cv-09308, (“Re: *Innovatio*”), p.16, (“At the same time, the court finds Dr. Teece’s testimony regarding the difficulty of distinguishing between the intrinsic value of the technology and the value of standardization to be persuasive. Part of the intrinsic value of a technology may precisely be the ease with which it can be adopted into a standard. For example, a technology may more easily interface with other extant technologies by making more efficient use of an existing infrastructure or requiring less modification to other technologies.”). See also *Microsoft Corp. v. Motorola, Inc.*, Findings Of Fact And Conclusions Of Law, Case No. C10-1823JLR (W.D. Wash. 25 April 2013), (“*Motorola v. Microsoft*”), at paragraph 79 (“Calculating incremental value for multi-patent standards ‘gets very complicated, because when you take one patent out of a standard and put another one in you may make other changes, the performance of the standard is multidimensional, different people value different aspects.’”)

³² In a formal economic model, one might be able to define an “optimal” split of the surplus which maximises long-run social surplus, i.e., how the marginal dollar of royalties might be best allocated as between the upstream and downstream firms. This would be a difficult exercise, even at the level of writing down a theoretical model, and the results would likely be dependent on parameters that are empirically impossible to identify, so extracting policy-relevant insights from such models is likely to be very difficult. (The range of parameters might include the elasticities of supply of innovation upstream and downstream; the social discount rate; the timeframe over which investment decisions are made, recognising long and variable lags between R&D and successful innovation, to name a few).

³³ The economic theory of bargaining predicts that where two parties have equal bargaining power, an equal split of the surplus will be the outcome of the bargaining. Both the bargaining models of Nash (1950) and Rubinstein (1982) have been used in support of this 50/50 split. See, for example, Chapters 2 and 3 of Muthoo, Abhinay (1999), *Bargaining Theory with Applications*, Cambridge, England: Cambridge University Press. But this is not the same as suggesting that such a split is economically optimal—for example, if the supply of innovation is more elastic upstream than downstream, one might favour a larger share of the surplus going to the upstream. Conversely, if the downstream firms assume the risk associated with commercializing innovation, then this would favour splitting the surplus more in their favour. Likewise, differences between the parties in terms of their risk aversion also influences the outcome of negotiations and may lead to a different split.

³⁴ See also footnote 8 for a fuller explanation of the “FRAND range” and its relationship to the concept of the “bargaining range.”

³⁵ See <https://www.etsi.org/intellectual-property-rights> (“Prior to making a patent licensing decision and implementing any SEP contained in the ETSI IPR Database, potential licensees shall always contact the declarant.”)

unless the implementer is able to “work around” the specific SEPs that it has been found to infringe and on which basis it was enjoined. Thus, the SEP holder can extract from the implementer, not just the value that its technology contributes, but potentially the entire value of participating in the standards-driven market.³⁶

While we agree that FRAND rates should not reflect hold-up value (i.e., be substantially based on what the implementer would pay to avoid being excluded from the standard), the existence of an actual hold-up problem has never been established with respect to the licensing of telecom standards-essential technology.³⁷ Also, the use of the term “hold-up” is inapt in these circumstances.³⁸ Hold-up, properly defined, would require that implementers make their investment under certain expectations about the availability of licenses on FRAND terms (and what those terms are), and then find that, ex-post, licenses are available on very different and more adverse terms. This ignores the possibility that implementers can (and sometimes do) negotiate for licenses before they begin making standards-related products. Even setting this aside, it is not credible to think that sophisticated implementers in today’s licensing market—with decades of SEP licensing and negotiating experience—are naïve with respect to what SEP holders might demand by way of royalties and non-price terms. Thus what is being termed hold-up is really just an assertion—which we will show is not well-founded—that in the circumstance that implementers plunge into making standards-compliant products before licensing the relevant SEPs, the threat of an injunction can confer substantial bargaining power upon the SEP holder and enable it to extract “too much.” Nonetheless, for convenience, we continue to use the term “hold-up.”

Galetovic et. al. (2015) provide the most sophisticated empirical analysis that we are aware of in regard to the hold-up issue. They find that “products that are SEP-reliant have experienced rapid and sustained price declines over the past 16 years”, and find that the “prices of SEP-reliant products have fallen at rates that are not only fast relative to a classic hold-up industry, they are fast relative to the patent-intensive products that are not SEP reliant.” Using a quasi-natural experiment to study the effect of the e-Bay decision on relative price declines in SEP-reliant versus non-SEP-reliant industries, they also do not

³⁶ This, of course, assumes that there are not alternative standards available. In the US, this assumption would not have held true until the 4G era, as there were multiple 2G and 3G standards in use (e.g., GSM and CDMA, and UMTS and CDMA2000).

³⁷ Geradin (2014) points to the fact that, in the *Microsoft v. Motorola* litigation, economists for Microsoft—all of whom advanced a hold-up-based theory of the case—were unable to identify any actual cases of hold-up. For instance, Microsoft’s expert, Timothy Simcoe, was unable to point to a single license from any company that reflected hold-up. Likewise, another expert for Microsoft was unable to conclude “from economic evidence” that patent hold-up was a real problem. See Geradin, Damien (2014), “The Meaning of ‘Fair and Reasonable’ in the Context of Third-Party Determination of FRAND Terms”, *George Mason Law Review*, Volume 21, Number 4, pp.919-956 at footnote 93 (citing to the evidence of Professors Murphy and Simcoe, and Dr. Matthew Lynde).

³⁸ “Opportunism” (or “self-interest seeking with guile”) is central to the idea of hold-up as defined by Nobel Laureate Oliver Williamson. Galetovic and Haber (2017) point out that absent an element of opportunistic surprise, hold-up theory could be applied to any circumstance in which there are sunk investments, and an incomplete contract. Thus, any disagreement over contractual terms and conditions could be labelled “hold-up.” For true hold-up to occur what must be demonstrated is that the SEP owner has taken advantage of the implementer’s sunk investment to attempt to extract terms that the implementer could not have anticipated at the time of making the investment. Galetovic, Alexander and Stephen Haber (2017), “The Fallacies of Patent Hold-Up Theory”, *Journal of Competition Law and Economics*, Vol.13, Issue 1, pp. 1-44

find that prices in SEP-reliant industries were more affected by the e-Bay decision (limiting the availability of injunctive relief) than in non-SEP-reliant industries. If hold-up was more of a problem in SEP-reliant industries, one would have expected to see a greater effect of the e-Bay decision in these industries than in those which are not driven by SEPs.³⁹

This is unsurprising: the presence of the FRAND commitment, the lack of availability of injunctive relief (particularly in the U.S., after the e-Bay decision) the repeat-game nature of standardization⁴⁰, and the bargaining power of many implementers (e.g., their ability to prolong litigation) all mitigate against hold-up. Most fundamentally, hold-up is unlikely in a setting where the implementer or prospective licensee can use the technology without paying for it, and absent an injunction—whose availability is not automatic and which courts will often determine with reference to the FRAND-ness of the licensor’s conduct—there is no way that the SEP holder or licensor can exclude this infringing use. This is a fundamental difference between “ordinary” goods and services and intellectual property rights, a point that Germany’s Federal Court of Justice recently recognized:

[U]nlike buyers of goods and services— standards implementers are in the favourable position to be able to access protected technology needed for producing standard compliant products, even without an agreement with the patent holder [Emphasis added].⁴¹

3. Hold-out: the bigger issue

The commonplace situation that we perceive instead is one in which an implementer begins manufacturing devices and implementing SEPs long before taking licenses to any of them. Many licensors issue notice letters to implementers years after use of the SEPs actually began. It is often at least a couple of years before licenses are agreed, and reasonably often, there is no agreement on the terms of a license. In many cases, perhaps something close to a decade will go by before litigation is launched and then perhaps one or two further years will pass before any decision—and any court-awarded damages or court-determined license is made available. In all, a decade or more might pass before the infringer pays anything for its use.

Even then, the licensee may pay no more than a low rate (e.g., one that is well within the FRAND range)—which the court may award on the basis of rates derived from comparable licenses without necessary adjustments to account for the difference between willing licensees and those who force the licensor into litigation. Alternatively, this rate may be based on inherently licensee-friendly formulations such as the “top down” method of

³⁹ Galetovic, Alexander, Stephen Haber and Ross Levine (2015), “An Empirical Examination of Patent Hold-Up”, NBER Working Paper 21090.

⁴⁰ SEP holders who wish to continue participating in repeat rounds of standards-setting activities run the risk that other members will seek to exclude them from future standardization activities if they are seen to have violated their FRAND commitment.

⁴¹ See English-language summary of *Sisvel v Haeir*, KZR 36/17, November 2020. <https://caselaw.4ipcouncil.com/german-court-decisions/federal-court-of-justice-bgh/sisvel-v-haier>.

allocating some aggregate reasonable royalty between the different licensors. Either way, a licensee that delays or strings out discussions has little incentive to take a license—at worst, it will have to pay the same FRAND rate that it would have paid anyway. At best, it secures an advantage over its licensed rivals, by remaining under the licensor’s radar.

In our experience, growing diversity in the nature and geographic focus of implementers and the emergence of new use cases such as those associated with the Internet of Things (“IoT”) actually exacerbate the problem. The share of implementers with licenses is likely falling, and at least in some environments—such as the licensing of IoT implementers—a collective action problem is emerging in which widespread infringement may be self-perpetuating.⁴² The source of the collective action problem is simple: licensed users will see themselves as being competitively disadvantaged relative to unlicensed users.

(a) Why hold-out arises

That such pervasive problems exist is not surprising. The perverse focus on hold-up makes these problems worse. Attention to the economic specifics of licensing and patent enforcement has always suggested that hold-out rather than hold-up would be a bigger risk.

First, hold-up exists only where sunk standard-specific investments exist. In mobile telecommunications, technology developers also make sunk investments in R&D relevant to the standard (and often these are made years before the standard is commercially implemented and licensing revenues can even begin to materialise). Implementers, should they choose to, can (and arguably should) negotiate for licenses before making sunk standard-specific investments: after all, these implementers only start making standard-specific products after the relevant standard is finalised. Technology developers, however, can only negotiate after they have sunk their R&D investments and after their technology has survived a selection process to get into the standard.

Thus, technology developers are at least as vulnerable to “reverse hold-up” or “hold-out” by implementers, as implementers are vulnerable to hold-up by the developers.⁴³ Indeed, given that implementers could, but rarely do, seek licenses before they start making standards-compliant products, and the length of time that it takes licensors to conclude agreements with industry players, and the considerations we note below arising from the nature of the enforcement of patent rights, the dangers of hold-out or reverse hold-up are

⁴² Heiden and Petit (2018) provide statistics that suggest that licensing coverage has fallen from roughly 73% of “implementing firms that are potential licensees” in 2006 to 39% in 2016. Their results appear to be based on interviews that they conducted with licensing experts and firms that are participants in the licensing marketplace. They attribute this “patent trespass” to a long tail of unlicensed implementers. See Heiden, Bowman and Nicolas Petit (2018), “Patent ‘Trespass’ and the Royalty Gap: Exploring the Nature and Impact of Patent Holdout”, *Santa Clara High Technology Law Journal*, pp.179-249.

⁴³ See Froeb, Luke and Mikhael Shor (2015), “Innovators, Implementers and Two-Sided Hold Up”, *Antitrust Source*, August 2015. Froeb and Shor state that the “innovator’s hold-up problem is more difficult to overcome” than any hold-up problem facing the implementers. The US Department of Justice has also recently acknowledged that the hold-up of innovators is a more serious a problem than the hold-up of implementers, discussed *infra*.

quite real and substantially underestimated.⁴⁴ In our view, although the theory of hold-up has historically been advocated more vocally, it is hold-out that is the greatest risk to licensing of ETSI standards.

Second, there is the very nature of patent rights. As a general point, it is far from straightforward for firms to attempt to earn returns from innovation through licensing of intellectual property. Arrow (2012) recognized this:

*It is generally accepted that the main source of profits to the innovator are those derived from temporary monopoly. Why is it that royalties are not an equivalent source of revenues? In simple theory, the two should be equivalent. Indeed, if there is heterogeneity in productive efficiency, in the use of the innovation in production, then it should generally be more profitable to the innovator to grant a license to a more efficient producer. This does happen, of course, but I have the impression that licensing is a minor source of revenues.*⁴⁵

A basic reason for this is that patent rights are not self-enforcing—a patent holder cannot do what most suppliers of goods and services can do, which is to simply withhold supply to those customers who do not pay for the good or service.⁴⁶ Instead, patent holders must resort to costly and time-consuming litigation to enforce their rights. In such litigation, the risks to licensors and licensees may be quite asymmetric in their nature. For example, a Court decision that is substantially different from the licensors' position on the FRAND value of its portfolio can potentially have a significant adverse impact on that licensor's longer-term licensing strategy. Akemann, Blair and Teece (2016) note (in the context of general patent litigation):

Intuitively, patent holders who face the prospect of having to litigate repeatedly against multiple infringers have to be concerned about what might be termed a “one-way ratchet” effect. If the patent holder wins one case against one infringer that does not mean that others will agree to take a license...[H]owever, if the patent holder ever loses a case – especially on validity grounds—then then there is likely to be a significant adverse effect on the patent holder's ability to gain license revenue from that patent in the future. In effect, the patent holder has to “win them all”, while the infringers may only have to “win

⁴⁴ This point is also made by the US Assistant Attorney General for Antitrust, Makan Delrahim. See, for example Delrahim, Makan (2017), “Take it to the Limit: Respecting Innovation Incentives in the Application of Antitrust Law”, 10 November 2017, US Department of Justice, at p.5. “As a result [of hold-out], SEP holders either receive a below-FRAND payment, obtaining damages on the fraction of their portfolio that has been successfully litigated, or they need to file sequential litigation to obtain payment for all of their infringed SEPs ... [P]atent hold-out can be a very attractive strategy for standards' implementers.” Layne-Farrar, Anne (2016), “Why Patent Hold-out is Not Just a Fancy Name for Plain Old Patent Infringement”, *CPI North America Column*. See also: Renaud, Michael, James Wodarski and Sandra Badin (2016), “Efficient Infringement And The Undervaluation of Standard-Essential Patents”, *IAM*; Epstein, Richard and Kayvan Noroozi (2017), “Why Incentives for ‘Patent Hold-out’ Threaten to Dismantle FRAND, and Why It Matters”, *Berkeley Technology Law Journal*, Volume 32, pp.1381-1431.

⁴⁵ Arrow (2012), *supra*, p.47.

⁴⁶ While this problem of not being able to automatically exclude infringers could also apply to the circumstance of a non-SEP patent that a firm wishes to utilize exclusively in its own products, it may be more acute in the world of ETSI-related SEPs where rights have to be enforced against multiple infringers, raising the costs of both detection and enforcement.

one.” In this way... risks associated with a single loss...could lead to a set of rates in the marketplace that are significantly depressed relative to actual value.⁴⁷

Similar “ratchet” effects could arise in relation to a repeatedly-litigated or repeatedly-negotiated SEP portfolio.

(b) Observations on the prevalence of hold-out

From an empirical perspective, Petit and Heiden (2018) note the emergence of a “long tail” of implementers or micro-vendors, who are individually small, but collectively account for a reasonable share of industry revenue, and who are not licensed. Many of these implementers are based in China. They note in this context that “a systematic patent trespass effect can be deemed to occur when 30% or more of a relevant market is unlicensed.” They relate this to a collective action problem: “why take a license if your competitors do not?” They note that the “systemic effect of patent trespass is primarily experienced through the impact on the technology market through the development of consensus-based standards.”⁴⁸ Heiden, Peters and Padilla (2020) note the presence of a similar “collective action” problem resulting in widespread hold-out in the IoT sphere.⁴⁹

These empirical observations echo the findings of Judge Essex of the U.S. International Trade Commission (as summarized by Renaud et. al).

[T]here is no evidence to support the notion that owners of SEPs have engaged in patent hold-up either in the investigation before him or in the telecommunications industry more generally. Rather, the evidence is all on the side of patent hold-out. The implementers of the standards are using the patented technology incorporated in the standards without authorisation [sic] and without even engaging in licensing negotiations because they know that the worst that can happen is that they get sued, are found to infringe and are made to pay the same FRAND rate that they would have had to pay for using the patented technology in the first place.⁵⁰

Judge Essex’s observations are confirmed by Vice President of Intellectual Property for a major implementer (Lenovo), who in effect says that licenses are only negotiated when the licensor is willing to accept less than the expected pay-off from litigation.

[T]hat’s the number one thing I use to assess whether I want to sign a license, is a careful analysis of whether...the likely outcome of litigation plus the expense...is ultimately greater than the negotiated alternative. And I’m very

⁴⁷ Akemann, Michael, John Blair, and David Teece (2016), “Patent Enforcement in an Uncertain World: Widespread Infringement and the Paradox of Value for Patented Technologies”, *Criterion Journal on Innovation*, Volume 1, pp.861-877.

⁴⁸ Heiden, Bowman and Nicolas Petit (2018), “Patent ‘Trespass’ and the Royalty Gap: Exploring the Nature and Impact of Patent Holdout”, *Santa Clara High Technology Law Journal*, pp.179-249

⁴⁹ HPP (2020), *supra*.

⁵⁰ Renaud, Wodarski and Badin (2016), *supra*. Judge Essex further concluded that this situation was “as unsettling to a fair solution as any patent hold up might be.”

*pragmatic; when the negotiated alternative is clearly less expensive, I'm happy to take a license. When the negotiated outcome is equal to or greater than the likely litigation outcome...I'm ready to keep negotiating and/or litigating as necessary.*⁵¹

This illustrates the fact that many implementers may prefer to eschew the licensing marketplace and instead force the licensor into litigation. It illustrates the fact that many implementers will only accept negotiated licenses at especially low rates, which then can become an albatross around the licensor's neck, as these same especially low rates may be used as benchmarks for "FRAND" rates in subsequent instances where the licensor has to litigate to enforce its portfolio. Thus, absent corrective measures (discussed below), there is a real risk that hold out will beget further hold out, reflected both in greater difficulty in negotiating licenses and a depression in royalty rates to below the level required to sustain healthy innovation in SEPs.

In summary, then, the very non-self-enforcing nature of patent rights directly indicates why hold-out rather than hold-up is a problem that we should expect to see in licensing SEPs. Our own experience with examining the smartphone licensing landscape in the context of litigation, and the empirical observations of other authors support this. Royalty revenues are a small share of the overall value-added from mobile telecommunications, and a small share of smartphone implementers' revenues.⁵² This calls into question the predictions of "hold up" theory and points to the reality that hold-out is an important characteristic of the licensing landscape today.

The reason that hold-out is a present and perhaps growing danger is that it is profitable to hold-out. The reason it is profitable to hold-out is related to the weakness of the regimes around injunctive relief, the fragmentation of the patent enforcement landscape at the global level, and the lack of corrective mechanisms in damages and license awards by

⁵¹ Ira Blumberg (Lenovo) quoted in United States District Court, Northern District of California, San Jose Division, *Findings of Fact and Conclusions of Law in Re: Federal Trade Commission v Qualcomm Inc.*, May 21st, 2019, at p. 179.

⁵² See also Galetovic, A., S. Haber and L. Zaretski (2018), "An Estimate of the Average Cumulative Royalty Yield in the World Mobile Phone Industry: Theory, Measurement and Results", *Telecommunications Policy*, Volume 42, pp.263-276. This estimates that relative to smartphone manufacturer revenues of \$425 billion in 2016, royalties were around \$14 billion, or 3.3 percent.

Courts. Simply put, the patent enforcement regime today does not adequately recognize the role of the licensee in maintaining the balancing act of FRAND.^{53 54}

The next section discusses what it would take to restore the balance.

V. TOWARDS A SOLUTION: RESTORING INCENTIVES TO TAKE A LICENSE

Our primary concern in this paper is the threat posed to open consensus-based standards by holdout behaviour. We have noted the obvious attraction for most licensees of holding out. At its root, a hold-out licensee will do no worse than a willing one; and it might well do better, i.e., it could end up paying nothing or by negotiating a license late in the day (when most of its sales and profits from using the technology are safely in the past) pay heavily discounted rates. Similarly, consider a situation in which the licensor offered a license on FRAND terms, the licensee declined such a license and made counteroffers that were not FRAND, or otherwise indicated its unwillingness to take a license on FRAND terms. In this case, even if the licensee were enjoined, it can still avail of a FRAND license at some point in the future. This perennial availability of a FRAND license weakens the power of the injunctive relief remedy. It encourages the licensee to try its luck in the courts rather than negotiate for a license. If the licensee escapes an injunction, it can continue to enjoy the benefit of infringement perpetually or until it forces the licensor into conceding terms that it likes.⁵⁵ Alternatively, if the licensee is enjoined, it may still have the option to have the injunction lifted by accepting a FRAND license, possibly the very same FRAND license it had been offered and turn down before.

⁵³ Another significant factor that favours hold-out is that while willingly negotiated licenses are usually at a global or at least multi-country level, enforcement actions involve country-specific patents. While the *Unwired Planet* case, upheld on appeal, has established that U.K. Courts can determine global license rates, a 2020 ruling in *IPCom v HTC* by the High Court in London (which is the only first instance venue that hears patent and FRAND cases) has potentially undermined this. This case concerned a licensee that had opted to submit to an injunction in the U.K., in which case the Court ruled it would only be liable for damages on a U.K. sales base. These damages could potentially be much smaller than the payments for past use (prior to the license date) that might arise under a global FRAND license awarded by the Court, thus increasing the attractiveness to licensees of submitting to an injunction as an alternative to letting the U.K. Court determine global license terms. This option of submitting to an injunction is an attractive one for those putative licensees whose future U.K. sales might be rather small. In *HTC's* case, they were expected to be minimal, so submitting to an injunction was indeed preferable to letting the Court determine global license terms, and as part of that determination, make an award for past use also based on *HTC's* global sales. Licensees would, of course, prefer a licensing environment in which licensors were forced to litigate on a patent-by-patent and country-by-country basis.⁵³ For an overview of the issues around fragmented global enforcement, see Dasgupta, Kalyan and David J. Teece (2020), "The U.K.'s Role as a Venue for FRAND Litigation: Have the UK Courts Gone Far Enough?", *CPI Antitrust Chronicle*, December.

⁵⁴ The Huawei-ZTE framework is one area that provides some basis for hope. This framework recognises that SEP licensing is a two-way street. There are obligations on the licensor, but importantly there are also obligations on the licensee, and an unwilling licensee cannot be protected from an injunction. This idea needs to be recognised more globally and it also (in our view) needs to be extended to encompass not just the availability of an injunctive relief remedy against an unwilling licensee, but to limit the availability of FRAND licenses to such unwilling licensees as discussed and explained in the next section.

⁵⁵ In *Apple v Optis*, there was another possibility, which arises in the context of the "FRAND injunction" paradigm used in the UK. Under this paradigm, an injunction is an alternative to accepting a license on FRAND terms. In that proceeding, Apple had communicated to the Court its unwillingness to accept FRAND terms as determined by the Court. This put Apple into the category of an "unwilling licensee", and the Court ruled that this meant the injunction could be applied even before the Court determined FRAND terms. In the alternative scenario, Apple would have continued to infringe *Optis'* SEPs at least until the Court handed down a decision on FRAND terms, which Apple could elect then to refuse.

The present standardisation and licensing systems lack sufficient corrective or countervailing forces to prevent this problem from not just entrenching itself but getting worse—as the unlicensed share of the industry increases, the stronger will be the incentives for other firms to resist taking licenses too. There do not seem to be any innate correctives to this problem of potential mass infringement, at least not for implementers who are not major contributors to standards and therefore face some consequences for past opportunistic conduct. Worse, there is some indication that hold-out is something of a norm—for example, many implementers will only sign a license several years or perhaps more than a decade after infringement began and most are able to limit the period of past use for which they pay royalties and/or are able to negotiate lower rates for past infringement. Thus as delay and concessions by the licensor that are related to that delay become a norm across all implementers, the harder it becomes to sanction such behaviour through the standard-setting process. This also increases the importance of courts recognising that an increasing fraction of licenses are tainted by hold-out and that basing royalty rate determinations for either licenses or damages on these licenses might end up perpetuating such hold-out.

Instead, it seems to us that the most practical real-world discipline on hold-out is likely to arise from a willingness on the part of the courts to engage with the intent of the FRAND commitment i.e., to fully recognise the centrality of balanced incentives to ETSI's standardization activities.

1. Strengthening injunctive relief

The most obvious force that is encouraging hold-out is the difficulty of obtaining injunctive relief. We are not aware of a single US District Court that has granted an injunction in a SEP-related case. The situation in Europe is better, and there is a well-developed framework (Huawei-ZTE) for assessing when injunctive relief is an appropriate remedy. However, even that framework does not prevent licensees from using validity and infringement challenges to delay or complicate the process.

As a practical matter, the licensing of ETSI-related SEPs is almost always at the portfolio level. Portfolios that have been licensed and/or litigated frequently almost certainly contain at least some valid and infringed patents. In this context, the leeway of licensees to resist taking portfolio licenses by challenging specific patents on validity and infringement grounds (as allowed under Huawei-ZTE)—even when the portfolios in question have been licensed many times and some of its constituent patents may serve as another mechanism by which unwilling licensees are able to raise SEP holders' enforcement costs. We note that under Germany's earlier *Orange Book* standard, the licensee was required to make an unconditional offer to license the portfolio (on terms that the SEP holder could not reasonably refuse), and was thus precluded from bringing validity and infringement challenges.

The English Court in *Unwired Planet* devised the concept of a “FRAND injunction.” Injunctions were only available at the point that the licensee turned down a FRAND determination from the Court. In practice, this allows licensees to go all the way up to the “FRAND trial” without any penalty for infringement—in the UK, this trial to determine FRAND terms would occur after a typically lengthy and costly process of validity and infringement trials as well as trials on separate, discrete issues. Again, given this potential for delay and given that the licensee’s worst-case scenario is a court-determined FRAND license, the threat of an injunction in the UK Court may not be a powerful motivation for some implementers to negotiate a license with urgency. Indeed, some implementers may be quite happy to accept an injunction in the relatively small U.K. market if the alternative is to avoid a global license agreement on terms determined by the U.K. Court.⁵⁶

2. Revisiting the scope of FRAND

Clearly, strengthened injunctive relief regimes in Europe and the US will help matters. But reforming the injunctive relief regime may not be an immediately available solution, and even then, it may need to be complemented by actions in other areas, given the scope and complexity of the enforcement problems identified above. Most notably, Courts should use damages awards and license determinations to redress the emerging imbalance between SEP holders and implementers.

(a) Recognising the economic harm from infringement in damages and license awards

As a point of principle, Courts should recognize that hold-out creates significant economic harms for the SEP holder in question, but also for the licensing marketplace. The problem before Courts in individual litigations is typically that a given SEP holder has failed to secure a license after a prolonged period of infringement by a given implementer. The harm in that particular case is not just the cost of delayed payment, but the indirect harm to the SEP holder’s licensing program. There are often externalities in licensing—securing a given license can confer credibility and momentum for the SEP holder’s broader licensing efforts. Conversely, failure to secure a license can damage progress with other would-be licensees. In particular, we are aware of some implementers—especially those in product segments such as IoT or among implementers focused on some emerging markets and on China—that will seek to tie either the terms of a license (e.g., payment)

⁵⁶ Of course, this option is not straightforward. The margins from U.K. sales relative to the cost of making those sales may be substantial (as much of the implementer’s cost base is incurred to support global rather than UK sales, it will still incur most of these costs even if it ceased its U.K. operations). Nonetheless, the implementer will consider the fact that in the alternative—where it took a license on terms decided by the Court—it would pay royalties on all its global sales. Further, it might also worry that other licensors will use the UK courts to pursue global royalty claims. In this situation, the additional royalties it could pay would cumulate to a potentially substantial amount—whereas the benefit of remaining in the UK market would not change. Accepting a U.K. injunction will prevent other claimants from pursuing claims in the U.K. Clearly, the smaller the implementer’s anticipated U.K. sales, the easier it will be to accept an injunction. Further, if global FRAND rates were applied just to U.K. past sales, this might also be conducive to the strategy of accepting an injunction.

or the very signing of a license to the SEP holders' success in signing on other implementers that they perceive as being in the same segment.⁵⁷ Further, there may be a broader impact on the licensing marketplace as a whole. Akemann, Blair and Teece (2016), for example, explain how widespread infringement begets more infringement, thus creating a “bandwagon effect”:

[W]hen there are many infringers, each infringer might believe there is a perceived safety in numbers, as each infringer might believe that the chance it will be pursued is low...the patent holder cannot refuse to supply the technology in the way that suppliers of tangible goods can... We would therefore expect to see that royalties negotiated in a marketplace with widespread infringement will typically be lower than those negotiated in circumstances where infringement was less common...In this regard it is worth emphasising the significant and asymmetric risks that a patent holder faces as it tries to enforce its patent rights against a long line of potential infringers.⁵⁸ [Footnotes omitted].

As addressed in more detail below, how Courts handle issues such as damages or the terms of FRAND licenses can thus have an impact not just in terms of alleviating economic harm arising from prolonged infringement, but in correcting the distortions in the wider licensing marketplace that arise from allowing such conduct to persist. The actions that courts take today will dictate not just future litigation outcomes, but future negotiations in the marketplace—which happen in the “shadow of the Court.”

(b) Limiting the availability of FRAND

In this context, the scope of the FRAND commitment is highly relevant. Consider a SEP holder that has been attempting to negotiate a license with an implementer for several years, and has finally brought the matter to litigation. If the evidence suggests that the putative licensee essentially had no interest in negotiating a license on FRAND terms, is it adequate that the redress available is a license on FRAND terms and damages for past infringement on FRAND terms, or an injunction? This is problematic for two reasons: (a) it potentially puts the litigious infringer on the same footing as more willing licensees, and (b) it actually does not restore the SEP holder to the position it would have been had the infringement never taken place as the SEP holder will not be adequately compensated for the harm it has suffered as a result of the infringement. While in principle the harm caused by the delay in taking the license might be quantifiable, the harm to the wider licensing program may not be so readily quantifiable. Even with respect to addressing the harm caused just by the delay to taking the license, Courts should be prepared to address this

⁵⁷ In the case of licensing in China, the European Union has recently instituted a suit at the World Trade Organisation (WTO) alleging that China follows a conscious policy of suppressing royalty rates for cellular SEPs—for example, through the use of “anti-suit injunctions” that prevent SEP holders from going to non-Chinese courts to enforce their patents. This not only represents a welcome recognition of the issues we discussed above, but also demonstrates the possibility that rates in negotiated licenses with a global scope may have hold-out embedded within them via a discount for rates in China. Also, the terms of licenses negotiated specifically for China may well reflect the impact of hold-out.

⁵⁸ Akemann, Blair and Teece (2016), *supra.*, pp. 873-75.

harm and to do so in an economically robust way—for example, instead of using statutory interest rates in damages awards, they can use the licensor’s cost of capital or some other measure of economic opportunity cost to address the issue.

More importantly, instead of giving the licensee the choice of eventually taking a FRAND license, once a licensee has been found unwilling, the most obvious corrective is to withdraw the option of a FRAND license.⁵⁹ The threat of being found unwilling and thus losing an entitlement to a FRAND license is likely more potent than the threat of being enjoined (which will only apply in a single jurisdiction anyway) and then being able to claim a FRAND license to lift the injunction. (If Courts across different jurisdictions consistently applied this logic, then it would also prevent the situation wherein the implementer can swallow an injunction in a less important jurisdiction and then prevail upon another court to award it a FRAND license).⁶⁰

Similarly, relaxing the constraint of FRAND may also correct the situation in which unwilling licensees submit to an injunction in certain jurisdictions (e.g., the UK) to avoid taking a license. In such cases, submitting to an injunction should be seen as a sign of unwillingness. To the extent that the remaining legal cudgel in the jurisdiction of the injunction is a damages award, this damages award should aim to restore the SEP holders’ position to what it would have been absent the infringement. Ideally, this would rectify the economic harm from infringement (as addressed above), but at a very minimum it should recognize that a negotiated license at first infringement would have been global or multinational in scope, and thus the damages award should reflect that. It should not be based on multiplying single-territory sales by a FRAND rate inferred perhaps from licenses that were global or multinational in scope. Alternatively, a license negotiation that only covered a single territory would not be bound by FRAND—the only circumstance in which the parties would negotiate willingly over a single territory license would be if the licensee had turned down a FRAND global license. In this context, the licensor would have no obligation to offer another, narrower, license still on FRAND terms—i.e., based solely on a split of value contributed by the technology, and so the negotiation would be outside the constraints of FRAND. The SEP holder would only agree to willingly negotiate on these lines if it were compensated for the costs and risks associated with undertaking territory-by-territory licensing.

We appreciate that these proposals might seem radical and might push Courts into territory that seems controversial. After all, while there is nothing explicit in the ETSI IPR policy that suggests that the FRAND commitment applies regardless of the licensee’s

⁵⁹ Antitrust or competition laws may, however, be available to serve as a corrective to any behaviour that harms the market. For example, in the case where a vertically-integrated licensor’s true interest is in excluding the licensee (which is a rival in the downstream market) and the licensor thus makes offers that are designed to exclude the competitor licensee, antitrust or competition laws may come into play.

⁶⁰ In this case, the injunction may be lifted if the parties negotiate a license, but that negotiation does not have to be bound by FRAND terms. To the extent that this results in supra-FRAND value extracted, this compensates the SEP holder for the broader harm that the licensee’s conduct has inflicted on it, while the remainder serves as a deterrent that could sharply correct incentives in the marketplace.

willingness, there is also no explicit provision that limits its application in the case of an unwilling licensee. To the extent that above-FRAND awards might contain a punitive or deterrent element, they may be seen as legally very difficult to justify.⁶¹ Nonetheless, at least the broader concept of restoring the licensor's economic position by recognizing the harm it suffers from infringement fits in with the idea of restorative or equitable damages, rather than being punitive.⁶²

3. If FRAND, which FRAND rate?

There is also a more practically oriented and less far-reaching minimal solution—which does not require a decision on whether or not FRAND applies—but which could still valuably reduce the problem of holdout. This solution draws upon the concept of the FRAND benchmark rate discussed previously in Section 1. As a practical matter, this FRAND benchmark rate can be set at the upper end of rates achieved in real-world licenses for the same patents or patent portfolio (in fact even these negotiated rates are actually likely to already reflect the effects of licensees' bargaining power and will thus likely be within the FRAND range⁶³). Many other licenses may be well within the FRAND range. Particularly in the context of lump-sum licenses for large sums of money, SEP holders may agree to trade-off rates against broader benefits to the licensing program. For example, a lump-sum license with a major implementer for a large sum of money delivers guaranteed revenues that accrue to the licensor's income statement immediately; they are thus attractive from a risk, cashflow and financial reporting perspective.⁶⁴ Likewise, such deals may beget other deals, as they confer credibility on the overall licensing effort. Further, some implementers may have significant bargaining power and enormous resources to litigate so they can force the SEP holder into costly and asymmetrically risky litigation—and thus extract rates that are towards the lower end of the FRAND range, if not below it. Clearly, it would be wrong to assign to those licenses who were unwilling to negotiate, lower rates that were offered in return for benefits to the SEP holder's licensing program. Nor should they benefit from the bargaining power of other licensees by getting "best price" rates.

SEP holders may also, as part of a willingly negotiated license, accept lower rates for past use than are applied to forward-looking use. By definition, such past infringement cannot be disciplined by injunctive relief, and in some cases, license negotiations are

⁶¹ For example, in the U.K., we understand that punitive or exemplary damages are rarely available, although perhaps deliberate or misleading conduct by the licensee to avoid taking a license might conceivably qualify.

⁶² In non-SEP-patent cases, Courts sometimes award damages on a "lost profits" basis, rather than a reasonable royalty basis. This is conceptually similar to recognizing the economic loss created by infringement that we refer to above.

⁶³ The true value contribution of the technology to the licensee's profits is typically not something that can be easily measured. As this is an important determinant of the FRAND range, we also do not generally expect to observe the "true" FRAND range. Instead, we rely on negotiated licenses as the best proxy for this FRAND range. However, these licenses form a conservative proxy in that the range of rates observed in these licenses is likely to be lower than the "true" FRAND range, because of the bargaining power of licensees.

⁶⁴ For a discussion of the practical benefits of different licensing structures, as licensing professionals perceive them, see Sigler, Todd, Ozer Teitelbaum and Keith Walker (2021), "Licensing Structures and Compliance in An Evolving IP Landscape", *Les Nouvelles*, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3771448.

concluded at a juncture in time when much of the licensee's use of the standard is in the past. However, it would be incorrect to allow the litigious infringer to benefit from reduced rates for past use that were given in the context of negotiated licenses. In fact, if damages awards for past infringement are based on effective rates that are "unpacked" from lump sums (often by dividing the lump sum amount over the licensee's entire period of use of the technology, bundling both past and future together), this by definition cannot resemble the result of a hypothetical negotiation conducted at the time of first infringement and before there is any past use. This hypothetical negotiation paradigm is the basis for reasonable royalty damages in countries such as the U.S. and U.K.

Using the FRAND benchmark or "full freight" FRAND rate for license awards and damages awards will create a distinction between the position of willing and unwilling licensees. This distinction is not "discrimination" at all, but simply a recognition that there is no "best price" obligation on the licensor. In any case, the non-discrimination prong of FRAND cannot be used to justify putting the unwilling licensee on the same footing as the (more) willing ones, as this would severely undermine the "balance" envisioned in the ETSI IPR policy.

Addressing the past use issue is also important to restoring the FRAND balance. If lower rates for past use become a type of entitlement (and are embedded into Court-determined rates) this creates two dangers for SEP holders and for the FRAND balance: (a) the licensee has ever stronger incentives to bank as much of its use in the past as possible, as it can then argue that this use should be at a heavily discounted rate; and (b) by delaying, the licensee can also reach the point where it can argue that the technology is less relevant than it was in the past, as patents are about to expire, and therefore it should pay lower rates on account of these factors too. By contrast, the incentives for delay are significantly reduced if lower rates for past use offered in the context of license negotiations are not available to licensees who force matters into litigation.

VI. CONCLUSIONS

From the perspective of economic and legal scholarship, the hold-out problem deserves more attention. Given the confidential nature of license negotiations and license agreements, it is difficult to fully convey the extent of the problem with public domain information, and to demonstrate just how much bargaining power implementers can enjoy, enabled by the law. In this context, Courts that have access to confidential licensing materials should not accept theories of FRAND that assume that its only purpose is to prevent hold-up or provide protection against the bargaining power of SEP holders. They should instead use the opportunity to scrutinize whether the licensing history and conduct of the parties before it supports such theories, or whether it instead suggests quite the opposite. Such an exercise would usefully inform assessments of the validity and usefulness of FRAND valuation methodologies that do not use market information, and

which are predicated on the idea of preventing hold-up, e.g., the so-called top-down and ex-ante incremental value methods.

Restoring “balance” requires recognising that the danger of hold-out is now greater than the danger of hold-up, and at the heart of that asymmetry between hold-out and hold-up is the non-self-enforcing nature of patent rights. The most important corrective action that can be taken with respect to the hold-out problem is the strengthening of possibilities for injunctive relief. However, there are other ways too in which hold-out can be made significantly less attractive to implementers. The distinction between willing and unwilling licensees is particularly important to appreciate in this context. While ideally the unwilling licensee should not benefit from FRAND—as it has not accepted the burden of taking a FRAND license in return for the benefit of being offered one—at a minimum, it should not get anything like the “best FRAND rate.” Creating even this wedge between unwilling licensees and the rest will at least serve to partially restore the balance that is very much at the heart of ETSI’s IPR policy.