

Perilous Deviations from FRAND Harmony— Operational Pitfalls of the 2015 IEEE Patent Policy

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Abstract — Standard Development Organizations (SDOs) have one thing in common: they uniformly refrain from formally defining the meaning of “Fair, Reasonable and Non-Discriminatory” (FRAND) licensing terms required for patents essential to implement technical standards, called standard-essential patents (SEPs). I call this uniformity in non-definition “FRAND Harmony.” However, in a bitterly contested and controversial move, the IEEE Standards Association (IEEE-SA) amended its patent policy, effective March 15, 2015, to become the only major SDO to substantively *define* FRAND licensing terms, a definition at great variance with other SDOs’ practice and a substantial deviation from IEEE’s traditional neutrality on FRAND terms. IEEE’s new departure from *de facto* industry standard licensing practice will put parties into irreconcilable legal positions: SEP licenses for new standards may not simultaneously conform to the new FRAND terms mandated by the 2015 IEEE patent policy, and to legacy FRAND terms in the old licenses that necessarily follows legacy technology. This will undermine dynamic efficiencies in innovation where new standards incorporate other legacy standards by reference as “normative,” and where standard amendments are rolled-up into new revisions of the standard. Under this new patent policy, IEEE Societies will be handicapped in developing new standards that build on legacy standards. IEEE’s deviation from FRAND Harmony has the additional potential of inducing a practice that would discriminate among SEP holders in adopting technologies in IEEE standards. Many top quality and complex standards projects may grind to a halt unless IEEE-SA reverses course, as another SDO did two decades ago when their similar experiment with FRAND disharmony failed.

Keywords—FRAND; Standard Essential Patent; Royalty; Injunction; ANSI, IEEE; ETSI; ITU.

I. INTRODUCTION

Technical standards promulgated by standard development organizations (SDOs) often incorporate technology that is contributed into the standard by innovators who hold patents on the technology, and use of that patented technology is essential to a compliant implementation of the standard. Such patents are called “standard-essential patents” (SEPs). In order to ensure that implementers of a proposed standard can use any patented technology that is essential to the standard, SDOs require prior to adoption of the standard voluntary commitments from holders of SEPs, to license the SEPs to all

standard implementers under Fair, Reasonable and Non-Discriminatory (FRAND) licensing terms.² Consequently, FRAND commitments in the last decades have ensured that SEP holders do not engage in opportunistic licensing practices.

Nevertheless, a *theoretical* conjecture advanced by Professors Lemley and Shapiro [1] posits the ability of SEP holders to demand more than the value of the patented technology and attempt to capture the value of a standard itself, “holding-up” standard implementers who have incurred sunk costs to design products that incorporate the standard. To reduce the putative risks of “hold-up,” academics proposed that SDOs amend their patent policies to reduce the uncertainty of FRAND commitments [2]. Relying on these theoretical academic conjectures of “hold-up” and assuming a purported market failure risk, a U.S. Department of Justice (DOJ) official in a luncheon speech encouraged SDOs to amend their patent policies “to seize the opportunity to eliminate some of the ambiguity that requires difficult ex post deciphering of the scope of a F/RAND commitment” and to engage in “experimentation with different costs and benefits” [3].

Since 2012, responding to pressures from various standards implementers, the International Telecommunication Union (ITU) and the European Telecommunications Standards Institute (ETSI) have considered amending their patent policies to define the meaning of FRAND. However, intellectual property rights committees of ITU and ETSI declined to adopt such amendments [4] [5], perhaps because no evidence of purported patent “hold-up” was ever produced. This was not the first occasion that ETSI had entertained further definition of FRAND. Such proposed amendments were made in 1993, 2003, and 2006; they were intensely controversial within ETSI, and ultimately did not survive [6]. Since 2007, *ETSI Guide on IPRs* [7] specifically disclaims any more specific definition of FRAND, stating instead that “such commercial terms are a matter for discussion between the IPR holder and the potential licensee, outside of ETSI,” *Id.* §2.2, and that “[s]pecific licensing terms and negotiations are commercial issues between the companies and shall not be addressed within ETSI.” *Id.* §4.1. Most other SDOs have similar disclaimers.

² The term FRAND in this paper refers both to “reasonable and non-discriminatory” terms, as well as to “fair, reasonable and non-discriminatory” terms, two formulations having no substantive difference. See, e.g., U.S. Dep’t of Justice & U.S. Patent & Trademark Office, “Policy Statement on Remedies for Standards-Essential Patents Subject to Voluntary F/RAND Commitments,” (2013), p1 n.2 (“Commentators frequently use the terms [RAND and FRAND] interchangeably to denote the same substantive type of commitment.”) www.justice.gov/atr/public/guidelines/290994.pdf.

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In a recent bitterly contested and controversial move, the IEEE Standards Association (IEEE-SA) *did* amend its patent policy for technical standards, effective March 15, 2015. In so doing, the IEEE became the only major SDO to substantively and preemptively *define* FRAND licensing terms by [8]:

- (a) defining “reasonable rate” royalty based on the SEP contribution to the “smallest saleable” Compliant Implementation. This differs from the long-standing and industry standard method of calculating royalties in most other licensing contexts, including the method used by federal courts awarding reasonable royalties under the previous IEEE patent policy. This established method used valuation based on the market value of the *contribution of the patented invention* to standard-compliant end products. Moreover, IEEE-SA explained that FRAND obligations “cannot be satisfied by offering only a complete SEP portfolio license rather than offering licenses for individual Essential Patent Claims” [9];
- (b) committing SEP owners to forgo seeking court injunctions or exclusionary orders at the International Trade Commission when an implementer refuses to take a license under the SEP holder’s offer of FRAND terms; and
- (c) permitting SEP holders to require reciprocal licensing only for SEPs of the same standard and not even for related standards.

In recommending these changes, an *ad hoc* patent subcommittee of IEEE-SA pointed to the “challenge” made by the DOJ official in her luncheon remarks in [3] as the reason for embarking on the amendment process [10]. However, there was no consensus at IEEE on the matter. Others at IEEE thought these “clarifications” of FRAND deviated from neutrality, favoring licensees over SEP owners; there was high skepticism of the proponents’ premise that the prior patent policy provisions actually jeopardized any implementation of any IEEE standard to require revision. So in November 2014, the Board of Directors of IEEE-USA, the U.S. affiliate of the IEEE, requested from its sister organization IEEE-SA “evidence (if any) that IEEE or IEEE-SA is harmed, or is threatened to be harmed, on account of its current patent policy” [11]. IEEE-USA further requested “detailed explanation of each proposed change in the Patent Policy provisions and how it solves or remedies the problems identified.” *Id.* IEEE-USA posed three further questions. Unfortunately, the IEEE-SA provided no responsive answers to any of these questions, and no evidence supporting the existence of any problem requiring solution.

A detailed discussion of these unanswered questions, of the merits of the 2015 IEEE patent policy change and the evidence (or lack thereof) of “hold-up,” are beyond the scope of this paper. These issues, including the recent DOJ Business Review Letter endorsing the 2015 IEEE patent policy can be found in [12] and [13]. Further discussion on serious concerns regarding the closed and non-consensus-based process by which the patent policy amendments were developed without the usual antimajoritarian safeguards normally used in developing IEEE standards is provided in this author’s memorandum that also reached the IEEE-SA Board [14].

This paper focuses instead on a narrower issue: if we take the 2015 IEEE patent policy as a given, what are its operational effects? The paper explains that the 2015 IEEE patent policy is a substantial deviation from the industry standard FRAND terms. The operational pitfalls of this patent policy are reviewed and a “FRAND Harmony Principle” is described. Because the 2015 IEEE patent policy is at disharmony with IEEE’s prior patent policy and those of other SDOs, dynamic efficiencies in innovation can be severely undermined when attempting to incorporate other standards by reference as “normative” in new IEEE standards. Working groups that request from legacy SEP holders new Letters of Assurance (LOA) of FRAND licensing of unexpired SEPs for legacy normative standards to be incorporated by reference into new IEEE standards will be unable to obtain those LOAs if the legacy licensing commitment is *not* on a royalty-free basis. This is because pledging such new LOAs for those old standards would require additional licensor concessions, which legacy SEP holders cannot give, because of the inherent conflict between the requirement of granting more favorable terms to licensees of the new IEEE standard and their pre-existing obligations under legacy LOAs to license on nondiscriminatory terms. As a result, to the extent that the legacy SEPs are unexpired, IEEE Societies sponsoring new standards will have difficulties incorporating legacy standards by reference, and many top quality and complex standards projects will likely grind to a halt. For the same reasons, obtaining compliant LOAs for new standard revisions into which previous amendments are rolled-up will be virtually impossible.

What follows is this author’s analysis of these operational pitfalls. Unfortunately, a *pro forma* “balanced” presentation here is illusive because, while opposing views on such pitfalls were solicited from the IEEE-SA since September 2014, IEEE-SA did not provide these views. Among the requests made by the IEEE-USA Board of Directors as described above was a request for “an explanation of how ... requests for new LOAs from SEP owners of legacy normative standards incorporated by reference in new IEEE standards subject to the Proposed Patent Policy will actually be fulfilled; and what action IEEE-SA will take when such SEP owners are unable to provide the new LOAs due to inherent conflict with their non-discriminatory license terms previously committed under legacy LOAs” [11]. As of this writing, the IEEE-SA provided no answer to this question to inform an ostensibly “balanced” presentation of the matter.

For a brief period in 1993, ETSI adopted “definitions” of FRAND in a patent policy similar to the 2015 IEEE policy: it prohibited injunctions by SEP owners [15], and prohibited SEP owners from requiring reciprocal licensing, effectively setting monetary compensation as a basis for licensing. *Id.*, §3.1. Following substantial resistance and protests by SEP owners, ETSI quickly backed down and in 1994 reverted to an intellectual property policy devoid of these definitions [16]. For the reasons explained below, this author predicts similar fate for the 2015 IEEE patent policy.

II. THE FRAND HARMONY PRINCIPLE

As far back as 1932, the predecessor of the American National Standards Institute (ANSI) adopted a patent policy stating: “if a patentee be willing to grant such rights as will avoid monopolistic tendencies, favorable consideration to the inclusion of such patented designs in a standard might be given” [17]. In 1969, we find that the term “avoid monopolistic tendencies” is no longer used, as ANSI’s patent policy required commitment to licensing under terms that were demonstrably reasonable and non-discriminatory (RAND) [17]. Since then, SDOs include such requirements in their patent policies as pro-competitive *ex ante* agreements. More recently, the purpose of FRAND requirements were described as intended to prevent essential patent holders from engaging in opportunistic licensing practices based on the advantage generated as a result of having their patented technology included in a standard. SDOs’ patent policies are generally heterogeneous and may differ substantially in the rules of disclosure, SEP declarations, transferability of obligations, and dispute resolution. However, the rights and obligations under the *licensing* terms are largely governed by the clauses describing the FRAND obligations, which are *essentially identical* across SDOs. This is because these licensing policies essentially provide for one of two options: commit to a non-discriminatory royalty-free licensing, or commit to license under FRAND terms wherein FRAND (or RAND) are merely spelled-out, adding nothing else and leaving the exact terms to bilateral negotiations. Because FRAND commitments by SEP owners are made through LOAs, these constitute binding contractual commitments to the SDO and its standards’ implementers [6].³

A. FRAND obligations are purposely Incomplete Contracts

A 2012 study commissioned by the US National Academy of Science of the patent policies promulgated by major SDOs found that none define the term “reasonable” and/or the term “fair” [18]. Likewise, the term “nondiscriminatory” is undefined and is also left to the mutual agreement of the parties involved (or to the courts in rare events of unresolved disputes), *Id.* The National Academy’s study reports that this absence of definitions is normative across virtually all SDOs intellectual property policies and that numerous attempts to interest new SDOs in defining the terms “reasonable” and “non-discriminatory” overwhelmingly failed. “In those few cases where rudimentary descriptions were included, they were later removed in order to facilitate recruitment of additional members that objected to including any definitions at all.” *Id.*, at 103.

³ See, e.g., *Apple, Inc. v. Motorola Mobility, Inc.*, 886 F. Supp. 2d 1061, 1083 (W.D. Wis. 2012) (“In this case, the combination of the policies and bylaws of the standard-setting organizations, Motorola’s membership in those organizations and Motorola’s assurances that it would license its essential patents on fair, reasonable and nondiscriminatory terms constitute contractual agreements.”); *Microsoft Corp. v. Motorola, Inc.*, 854 F. Supp. 2d 993, 999 (W.D. Wash. 2012) (“[T]hrough Motorola’s letters to both the IEEE and ITU, Motorola has entered into binding contractual commitments to license its essential patents on RAND terms.”); see also *Microsoft Corp. v. Motorola, Inc.*, 696 F.3d 872, 884 (9th Cir. 2012) (upholding the district court’s conclusion that Motorola’s RAND declarations to the ITU created a contract enforceable by third-party beneficiaries).

This finding is neither surprising nor accidental. Licensing negotiations are multifaceted, and what constitutes “reasonable” or “fair” depends on the particular circumstances of the bargaining parties. One size rarely fits all, and the definition of these terms for all standards of the SDO and for all pairs of parties in bilateral license negotiations is elusive and may be counterproductive.

Epstein, Kieff and Spulber [19] explain that there are many reasons why identical terms will not be appropriate in all FRAND cases. Some licensees are in a position to supply cross-licenses of varying value to the licensor. In other instances, licensees may engage in some other form of valuable commercial cooperation such as a commitment to make market-expanding investments, or to engage in risk-sharing with the licensor through an up-front payment. Yet other circumstances involve a commitment to return valuable information to the patentee, or sign on sooner when the technology is riskier and the value of the license less certain (for example, before a standard is developed). Each of these forms of value may be balanced by a lower cash license fee or royalty rate.

FRAND commitments are often carefully formulated and scrutinized before SEP holders make them to an SDO, and a transacted set of commitments that are deemed by the parties as FRAND represent the *end-point* of a bargaining process. In some instances, LOAs are submitted to the SDO *only after* the SEP owner agrees with several initial implementers on licensing terms, forming a basis for the FRAND terms offered to others.⁴ Such successful initial licensing agreements constitute the SEP owners’ internal assurance of licensing feasibility that reduces its risk in making the irrevocable FRAND commitment to the SDO. In the process, specific licensing relationships and business models are developed as frameworks for future (related or unrelated) standards development. “Fairness” and “reasonable” are self-enforcing for both SEP holders and licensees, because both are mostly “repeat players” and are often on both sides of the licensing bargain in this market for technologies.

Without further SDO definition of FRAND, market conditions often induce SEP owners to voluntarily provide more specificity by publishing what they consider a “reasonable” royalty rate. For example nine separate SEP holders in the LTE telecommunications standard have announced the maximum royalty rate they each may charge for a license on a portfolio of SEPs for LTE [21].

For the reasons explained above, SDOs do not define FRAND terms in their patent policies, or otherwise constrict the ability of parties to negotiate, giving the parties flexibility in arriving at terms that *the parties* deem FRAND for their specific circumstances. The submission of an LOA contractually binds the submitting SEP holder to license under royalty-free terms or to make an offer of a license under FRAND terms to anyone who seeks a license for implementing

⁴ For example, in May 1992, Zenith, General Instrument, MIT, and AT&T signed a patent royalty agreement on patents essential for the Advanced Television Systems Committee (ATSC) digital television standard [20]; subsequently, all but AT&T made their first FRAND commitments as SEP holders to ATSC in 1995. See <http://atsc.org/policies/patent-statements>.

the standard. That binding contract, however, is *incomplete* because it does not further elaborate on the substantive rights and obligations of the parties. Generally, such contracts are called “Incomplete Contracts” in the economics literature [22] [23].

Incomplete Contracts are often economically more efficient by leading to higher incidence of bargaining success, particularly when surrounded by some implicit governance structure or some prior course of dealing that builds up trust. Because of their lack of rigidity, such contracts can facilitate what economists call *Pareto improvements* (i.e., making at least one party better off without making any other party worse off) over the economic outcome in an otherwise-complete pre-written contract. Under such Incomplete Contracts, parties in bilateral negotiations may converge on diverse contractual terms suited for their unique circumstances, terms that might be contrary to terms of an otherwise more complete contract imposed on the parties. Incomplete FRAND contracts are therefore completed through *bilateral negotiations* and perfected by the licensing agreements of the parties. For any given SDO—indeed, for any given standard—end-result license *terms* under FRAND commitments can differ substantially across end-result licensing contracts, even though they were negotiated under identical FRAND constraints.

To be sure, social costs *are* incurred when FRAND contracts are incomplete, which is the point advanced by the proponents of the 2015 IEEE patent policy. In economics, increased transaction costs and the possibility of post-contract opportunistic behavior have been recognized as theoretical sources of potential costs [24], [25] at 259, but with virtually no empirical substantiation of the latter.⁵ In some cases it may lead to disputes and litigation [2]. However, those costs and the relative rarity of FRAND litigation in SEP licensing must be properly assessed and balanced against the social costs of the alternative—mandatory *universal* and uniform contracts that may result in no agreement at all, or in leaving little room for adapting to particular circumstances, by force-fitting a specific interpretation of FRAND for *all* circumstances and parties. Joshua D. Wright, Commissioner at the US Federal Trade Commission, recently remarked that “neither economic theory nor available empirical evidence supports the proposition that filling contractual gaps by suggesting specific [FRAND] terms or with the threat of antitrust enforcement actions is likely to achieve [competition] goals” [26]. He added, “[i]ndeed, there is at least as much support for the proposition that reforms and enforcement aimed at ‘perfecting’ [SDO] contracts will do more harm than good for competition and consumers” *Id.*

Therefore, one must also take into consideration the social costs of “filling gaps” in incomplete FRAND contracts, particularly at IEEE, where such provisions were adopted by a group-decision through governance procedures lacking

consensus and antimajoritarian safeguards [14]. In this case, there exist significant risks on both sides: that explicit or tacit collusion among oligopolists (SEP holders) will keep license rates high, or among oligopsonists (implementers), to depress license rates by engaging in “reverse hold-up” or expropriation by licensees of the value of patented inputs akin to a buyer’s-side cartel [27]. Because contributions of patented technologies to standards are voluntary, the suppression of compensation to SEP owners will lead to unavoidable selection of willing participants: if prices for patented technology inputs are driven lower, IEEE would lose access for all but easily attainable technologies for which participating patentees can obtain positive return on relatively small sunk investments in innovative activity. High quality pioneering advances in technology resulting from more substantial R&D investments requiring higher compensation (such as in Wi-Fi), may not be made available to IEEE standards. The quality of the standards would be lower and there may be fewer of them promulgated.

For example, the 2015 IEEE patent policy prescribes the terms described in Section I above, terms that were previously left to negotiation between parties. These “clarifications” and definitions sufficiently and intensely worried at least 14 SEP holders, that they threatened to withdraw their contribution of patented technology to future IEEE standards—these SEP holders contributed 45% of patents declared essential in IEEE standards in recent years [12], Slides 10-11. Four of these SEP holders have already acted on that threat by announcing their refusal to license their patents under the 2015 IEEE patent policy [28]. As in any other area of economics, if an external force depresses price, supply will be reduced. Indeed, recent analytical economic modeling predicted that the imposition of a constrained valuation licensing rule as in the 2015 IEEE patent policy would reduce the probability that a patentee will contribute technology to the SDO [29].

The social costs of potentially losing nearly half of the technology inputs for future IEEE standards are not merely dynamic long-term costs; manifestations of short-term costs are already apparent as work on the IEEE-802.11ah standard amendment, the “Long Range WLAN at Sub 1 GHz,” appears to be at an impasse. Qualcomm, the top SEP contributor to IEEE, declared 46 SEPs in IEEE-P802.11ah and submitted an LOA for these SEPs with a FRAND commitment, but without the additional new concessions required under the 2015 IEEE patent policy; IEEE-SA’s patent committee then rejected Qualcomm’s LOA as non-compliant [30]. Subsequently, a member of the P802.11ah task group and a Cisco employee had suggested a design-around to avoid the Qualcomm SEPs and proposed a resolution to “develop and execute a process to consider alternative technologies as part of 802.11ah.”⁶ He added that “[it] is possible that this process will result in significant changes to the 802.11ah and considerable delay before the next Letter Ballot.” *Id.* Of course, it is unclear how one would know what patent claims to design-around, as still others may come forward and declare other SEPs while declining to submit LOAs under the 2015 IEEE patent policy. In any event, the task group for IEEE-802.11ah was unable to resolve the impasse due to lack of accepted LOA and projected

⁵ Since the academic work on “hold-up” draws on Coase’s theoretical work in the 1930’s, it is noteworthy that Coase himself always remained skeptical about hold-up as an empirical phenomenon. Coase observed based on his empirical work that long-term contracts were typically incomplete and that opportunism was not a serious or common problem ([25], at 260) and in general he concluded that opportunistic behavior is deterred by the need for ongoing future business.

⁶ www.ieee802.org/11/email/stds-802-11-tgah/msg00774.html

further delay, rescheduling an Executive Committee approval of the 'ah standard from January 2016 to July of that year.⁷

These are only a few of the short-term social costs associated with the 2015 IEEE patent policy's overwrought definition of FRAND. The following sections describe for the first time other, but no less important, short-term social costs of the change in the patent policy—costs due to the perilous deviations from FRAND Harmony.

B. FRAND Harmony and its manifestations

A hitherto unidentified but important salutary aspect of the universal “silence” across SDOs with respect to a definition of FRAND is the universal harmony of the *operational* meaning of this term across all SDOs—a *de facto* commercial industry standard. All SDOs that permit economic remuneration for SEP owners (in addition to the obvious option of royalty-free licensing) are unified in their requirement that SEP owners who voluntarily commit to license their SEPs do so under terms that are “fair,” “reasonable” and “nondiscriminatory;” SDOs are unified in keeping the FRAND contract incomplete *in the same way*—by refraining from further defining these terms. Formally, the terms “FRAND” and “royalty-free” mean the same thing across SDOs. This harmony is not in actual license terms found in FRAND contracts, but rather in the uniform SDO-imposed *constraints* under which such license contracts are negotiated. Simply put, FRAND Harmony is a standard, arising out of uniform commercial practice, a standard that allows cooperation and interoperability, just as a technical standard does. It should be clarified that because virtually all SDOs include the option of royalty-free licensing terms, LOAs pledged to an SDO having royalty-free terms as its exclusive patent policy option, are by definition harmonious with other SDO’s policies.

While not using the term FRAND Harmony, multiple participants in ETSI’s 2003 debate recognized this industry standard concept as a matter of global consensus. Microsoft observed that “FRAND is a standard principle throughout all SDOs,” while Motorola asserted that the “FRAND term is identical in ITU policy, Japan SDO, US SDO ... and this [FRAND] is the standard way to express it” [6].

The salutary aspects of FRAND Harmony have been exploited by companies and industries for decades:

- (a) **Contract efficiencies.** FRAND Harmony facilitates efficiencies in licensing negotiations and agreements, because common licensing provisions are used for licensing patents essential in multiple SDOs.
- (b) **Portfolio licensing.** FRAND Harmony facilitates patent portfolio licensing on a broad technology basis rather than under disparate standards, patent-by-patent and SDO-by-SDO fragmentation.
- (c) **Reciprocal licensing.** FRAND Harmony facilitates reciprocal licensing arrangements, because parties can negotiate for symmetrical terms and grant-back provisions involving multiple standards. This increases liquidity and exploitation of patent assets.

- (d) **Established standards as building blocks in new standards.** FRAND Harmony enables new standards to seamlessly employ earlier standards (even standards from another SDO) by simple incorporation by reference.

The fourth item above is an essential element in many standards which often form base-platforms widely adopted by producers and users of complementary innovations. FRAND Harmony across SDOs ensures dynamic efficiencies in innovation, since many standards incorporate as “normative” other standards by reference. Implementers of a given standard would likely need to license patents deemed essential for the normative reference standard because “[n]ormative material is information required to implement the standard and is therefore officially part of the standard;”⁸ and because “[n]ormative references are documents that contain additional material that is *necessary* to implement the standard. Thus, normative references are indispensable when applying the standard.”⁹

For example IEEE Std. 802.17 (2004) for “Resilient Packet Ring (RPR) Access Method and Physical Layer Specifications” incorporates by reference 28 other normative standards from a total of eight (8) SDOs including IEEE.¹⁰ It is all but inevitable that at least some of the patents essential for complying with these 28 standards are essential for complying with the IEEE-802.17 standard. So when the IEEE-802.17 standard was promulgated, the FRAND requirements in the patent policies of the seven other SDO’s (including those requiring royalty-free licensing exclusively) were in essential harmony with those of IEEE, and no scope discrepancy in SEP owners’ FRAND (or royalty-free) commitments arose. Those commitments made by legacy SEP owners to the seven counterpart SDOs under legacy LOAs essentially satisfied the FRAND constraints of IEEE-SA at that time.¹¹ This is shown schematically in Fig. 1. As Section III below shows, however, substantial pitfalls beset standards working groups of an SDO that breaks from the *de facto* industry standard by materially deviating from the FRAND Harmony Principle.

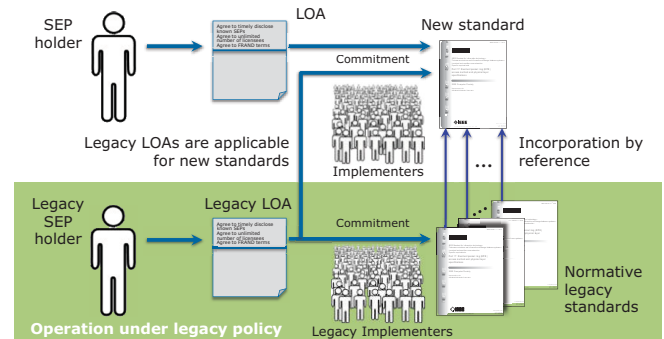


Fig. 1. The FRAND Harmony Principle facilitates seamless incorporation of legacy standards as normative references.

⁸ IEEE-SA Standards Board Operating Manual, § 6.4.1.

⁹ *Id.*, § 6.4.6. (Emphasis added).

¹⁰ The number of such standards incorporated by reference listed by SDO are ANSI (1), EIA/JEDEC (1), IEEE (6); IETF (9); ISO/IEC (3), ITU-T (4), OIF (3), and Telcordia (1).

¹¹ Commitments to license under royalty-free terms has long been one of the options in IEEE patent policies, including in the 2015 policy, and so the discrepancy discussed in this paper does not arise under legacy commitments for royalty-free licensing.

⁷ <https://mentor.ieee.org/802.11/dcn/15/11-15-0950-00-00ah-july-2015-tgah-closing-report.pptx>

III. DEVIATIONS FROM THE FRAND HARMONY PRINCIPLE

A. *New IEEE FARAND licensing terms materially more favorable than those extended to licensees under old legacy FRAND commitments*

In March 2015, the IEEE-SA changed the IEEE patent policy, attempting to “fill the gaps” by inserting what proponents of the revision called “clarifications” of the meaning of FRAND. The changes, however, are substantive. As summarized in Section I above, these changes entail *additional material binding concessions* from SEP holders.

For example, under the new IEEE-SA patent policy, the SEP holder must waive seeking injunctive relief until it has successfully litigated claims against the unlicensed implementer to conclusion in a court of appeals [8], which could take years. This practically denies the SEP holder reasonable royalties when an implementer holds-out and refuses the license offer; it grants infringers a free real option because an adjudicated royalty rate based on lost profits is unlikely to compensate the patentee for the full opportunity cost of involuntary exchange under a regime in which injunctions are not issued [31]. These clearly constitute economic transfers from SEP holders to implementers, due to the loss of the threat of injunction [32] [33]. Indeed, the 2015 IEEE patent policy contemplates such lower negotiated royalties *simply because* of the removal of the threat of injunction: otherwise, it would not have required that the analysis of comparable licenses for purposes of determining a FRAND royalty “should” consider *only* licenses for which the SEP holder had relinquished the right to seek, enforce, or even threaten, an injunction against an unlicensed implementer [8]. Waiving the right to injunction also diminishes the alienability of the patented technology: because the sole legal value of a patent is the right to exclude through an injunction (a royalty is simply a negotiated price for waiver of the patentee’s right), this provision substantially depletes the market value of the contributed patents.

Furthermore, under IEEE’s new mandated definition of FRAND, determining “reasonable rate” requires valuation that “should include” the consideration of “the value of the relevant functionality of the smallest saleable Compliant Implementation that practices the Essential Patent Claim” [8]. This requirement would result in substantially lower royalties than those obtained under the prior IEEE patent policy, where courts have used the value of the SEP contribution to the standard-compliant end-product for calculating the “reasonable rate.”¹²

The Court of Appeals for the Federal Circuit (CAFC), the sole federal appellate tribunal for patent law cases, recently addressed both the use of comparable licenses and the proper product basis for purposes of determining a FRAND royalty. The court rejected the alleged infringer’s theory that comparable licenses must be those for Wi-Fi chips and not for properly apportioned licenses for the end-product (licenses

which were obtained under no patentee waiver of injunction).¹³ The CAFC also specifically rejected the argument that the FRAND rate should be based on the value of “the smallest saleable Compliant Implementation.”¹⁴ By its interpretation of the then-current IEEE patent policy, the court explained that “reasonable” royalty must be based on the value added by *the contribution of the SEP’s patented invention* to the standard-compliant end-product.¹⁵ Thus, the default mode of reasonable royalty analysis is based on value added, or the *economic surplus* attributable to the SEP’s claimed invention, rather than the value of its *physical instantiation*. This analysis by the court tracks the economics of voluntary license negotiations—the parties look to the total net value created by the invention, and allocate that among themselves.

There can be no doubt that the 2015 IEEE patent policy changed that default royalty valuation mode. Informed of the *Ericsson v. D-Link* case in which the court rejected a defendant’s argument that the existing IEEE licensing assurance obligated “smallest saleable” chip-level licensing, the IEEE-SA response was that this fact “simply underscores the need for policy clarification” [34]. Indeed, it is significant that the 2015 IEEE patent policy was adopted in February 2015 [35], two months after the CAFC’s ruling on the meaning of FRAND under the previous IEEE patent policy. IEEE-SA was informed of, and has had the opportunity to “fill the gaps” in its FRAND contract, to track the CAFC interpretation, but declined to do so. Rather, IEEE-SA expressly adopted contrary provisions signaling a different “intent of the parties” in the new FRAND contract. For “reasonable rate” the new patent policy states that a particular physical instantiations formula “should” be used rather than the economic value of the essential claimed invention. The new patent policy does not identify *other* factors that “should” be considered in such valuation. The new patent policy conspicuously left out traditional factors [36] and several “*Georgia Pacific*” factors relevant to determining “reasonable rate” for royalties, contrary to the CAFC decision.¹⁶ Coupling this myopic approach with the requirement that the analysis of comparable licenses “should” consider only licenses for which the SEP holder had waived the right of injunction, there can be no doubt that IEEE-SA intended a significant and material change in the IEEE patent policy; otherwise it would not have bothered with the controversial amendments in a highly contested process.

Pointing to the word “should” in the IEEE new “reasonable rate” definition, some argued that this merely suggests “the smallest saleable Compliant Implementation” as one possible factor, but does not actually compel the use of this factor exclusively. However, given the language and the adoption record of the 2015 IEEE patent policy as described above, one must not be misdirected by the meaning of the term “should” as employed in *standards parlance* used by standard engineers.

¹³ *Ericsson v. D-Link Sys.*, 773 F.3d 1201, 1225-6 (Fed. Cir. 2014).

¹⁴ *Id.*, 773 F.3d at 1231.

¹⁵ *Id.*, 773 F.3d at 1233 (“a royalty award for a SEP must be apportioned to the value of the patented invention...”)

¹⁶ *Ericsson*, 773 F.3d at 1232 (“We believe it unwise to create a new set of Georgia-Pacific-like factors for all cases involving RAND-encumbered patents. Although we recognize the desire for bright line rules ... courts must consider the facts of record ... and should avoid rote reference to any particular damages formula.”)

¹² *Ericsson v. D-Link Sys.*, 2013 WL 4046225 (E.D. Tex. Aug. 6, 2013) p. 36. (Defendant’s “smallest saleable” calculation based on a *chip* resulted in royalties per router of “pennies or fraction thereof,” whereas the court accepted a calculation and award based on the contribution of the SEP portfolio to the added value of *the router*, yielding 15 cents per router).

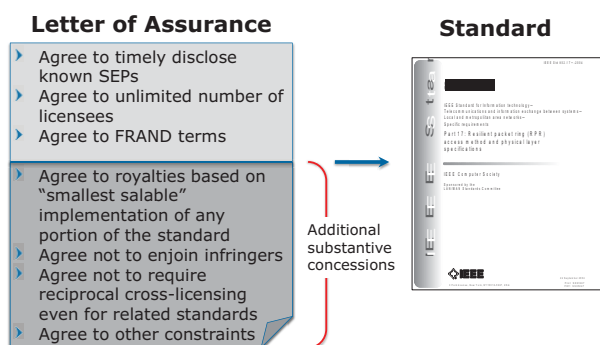


Fig. 2. LOAs under the 2015 IEEE patent policy require substantive material SEP holders' concessions under FRAND beyond those harmonized across other SDOs. This is shown schematically in the darker LOA section.

In parsing technical standard documents, the term "should" connotes engineering discretion in *implementation*, formally distinguishable from the term "must." However, clauses of the new patent policy would not be legally interpreted under rules of standards engineering practice; they must be interpreted as the courts would, under *contract law*, where the omission of other factors to consider, and the word "should" attached to only one valuation factor to the exclusion of all others, reflect the "intent of the parties." Such interpreted intent will likely turn that valuation factor into a *de facto* immutable rule and a contractual "must."

In any event, it should be clear that prospective licensees will have a significant interest, and indeed a strong case, for insisting on using only the factors falling under the "should" category identified in the 2015 IEEE patent policy and no others. Similarly, despite the absence of express pertinent language in the body of the 2015 IEEE patent policy, prospective licensees would have a strong argument that future bargaining parties and the courts are required to accord substantial deference to the IEEE-SA's interpretation of its patent policy as expressed during public comments. In reply to such public comments the IEEE-SA contemporaneously explained that the FRAND commitment "cannot be satisfied by offering only a complete SEP portfolio license rather than offering licenses for individual Essential Patent Claims" [9]. This provision runs counter to most FRAND licensing practices used under FRAND Harmony.

Taken together, these 2015 IEEE patent policy substantive deviations from previous industry-standard implementation of FRAND licensing create new obligations to be undertaken by SEP holders, and new rights to be conferred primarily upon licensees and implementers. These are material changes in the FRAND contract, changes under which SEP owners would make substantive and material concessions beyond those made under legacy FRAND commitments. This is depicted schematically in Fig. 2, where the additional key concessions under FRAND are depicted schematically in the bottom part (in dark gray).

B. Substantial disparity in FRAND license terms expected

The rights of licensees under the 2015 IEEE definition of FRAND will be incorporated in licensing agreements with SEP holders that elect to submit LOAs under the 2015 IEEE patent

policy. Having waived their right to injunction, SEP holders will enter into these agreements that "should" include the "smallest salable" component-level licensing royalties. This is because the patent policy says so, and because the "smallest salable" component licensing becomes more consistent with "licenses for individual Essential Patent Claims" [9] rather than the disallowed demands for patent portfolio licensing. Moreover, the design of the 2015 IEEE patent policy ensured that there would be no check on these low licensing rates, because no comparison with comparable licenses for which a SEP holder had relinquished the right to injunction will be available for several years.

The effect of SEP holders' injunction waivers on these license agreements will go beyond suppressing the negotiated royalty rates. License contracts are generally silent on injunctions because patentees almost never waive their right to injunction—the right to exclude is the core of the patent right, and by silence, license contracts leave injunction as the available fallback remedy in case of licensee default.¹⁷ In contrast, licenses under the 2015 IEEE patent policy will contain express covenants prohibiting injunctions throughout the relationship of the parties. These covenants benefit licensees in the event they default on their royalty payments. Counsel to a licensee may be viewed as derelict in their duty to their client by not insisting that the license agreement perfect and memorialize the SEP holder's waiver of injunction under the 2015 IEEE patent policy.

In conclusion, many 2015 IEEE patent policy-based license terms would clearly be more favorable to licensees than the terms under legacy FRAND commitments. SEP owners will receive substantially lower license royalty rates and will have less power to enforce licensees' specific performance. This deviation contravenes the FRAND Harmony Principle.

C. Deviation from the FRAND Harmony Principle frustrates the incorporation by reference of legacy standards in new IEEE standards

The 2015 IEEE patent policy definition of FRAND deviates from the FRAND Harmony principle because it grants materially more favorable rights to licensees than they received under the legacy or harmonized FRAND definition. This material deviation from *de facto* standard practice will frustrate the orderly incorporation of established standards as normative references in new IEEE standards. The problem is depicted in Fig. 3 below. Note that under the 2015 IEEE patent policy, the definition of "Essential Patent Claim" in pertinent part "shall mean *any* Patent Claim the practice of which was *necessary* to implement either a mandatory or optional portion of a normative clause of the IEEE Standard..." [8] (emphasis added). Thus, it is immaterial whether the patent claim is essential for implementing new features in the new standard, or for implementing features of the normative reference standard because "[n]ormative references are ... *necessary* to implement the standard" (emphasis added). Therefore, claims essential to

¹⁷ *Kunkel v. Topmaster Int'l, Inc.*, 906 F.2d 693, 696 (Fed. Cir. 1990) (holding that patentee's right to equitable relief in aid of a request for relief at law is generally available; finding that Kunkel's complaint against a defaulting licensee adequately pleaded a claim for patent infringement, for damages and for injunctive relief).

implement the normative reference standard through the new standard are deemed “Essential Patent Claims” and cannot be treated differently under the IEEE-SA patent policy. As such, “[i]f the IEEE receives notice that a (Proposed) IEEE Standard may require the use of a potential Essential Patent Claim, the IEEE *shall* request licensing assurance, on the *IEEE-SA Standards Board approved Letter of Assurance form*, from the patent holder or patent applicant” [8], §6.2 (emphasis added).

The request described above would clearly be for an LOA that complies with the new patent policy—in an “approved Letter of Assurance form.” For normative references that are IEEE standards, the IEEE-SA Standards Board (SASB) Operations Manual, provides in §6.3.5 as follows (emphasis added):

The Working Group Chair shall initiate a request for a new Letter of Assurance from a known Submitter when re-using portions of, or technologies specified in, an existing (Proposed) IEEE Standard, amendment, corrigendum, edition, or revision referenced in an Accepted Letter of Assurance in a different (Proposed) IEEE Standard.

For normative references other than IEEE standards, the IEEE-SA Frequently Asked Questions publication provides as follows [37] (emphasis added):

The Working Group chair shall initiate a request for [an LOA] from holders of potential Essential Patent Claims when reusing portions of a non-IEEE standard in an IEEE Standard. The Working Group chair should not assume that any patent [LOAs] given to the developer of the non-IEEE standard will also apply to the IEEE Standard. In addition, there are specific requirements that must be incorporated into an IEEE [LOA] in order for it to have the possibility of becoming an Accepted Letter of Assurance.

Thus, as Essential Patent Claim is defined, there can be no “grandfathering” of legacy LOAs. IEEE standards working groups, as they develop new or revised standards, must diligently obtain new voluntary FRAND commitments under the new patent policy, pledged through new LOAs. This is depicted in Fig. 3, wherein the Legacy LOA is shown as having been previously pledged for legacy standards that are incorporated as normative references in a new IEEE standard.

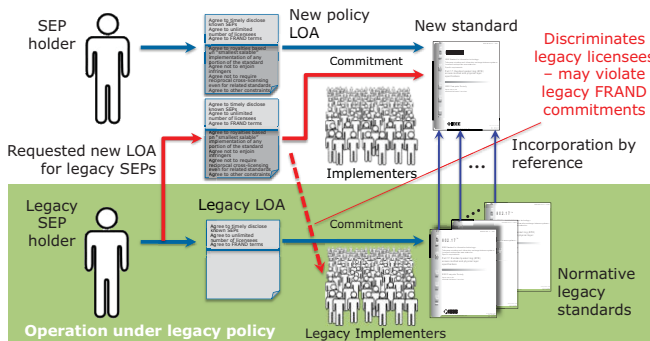


Fig. 3. Incorporation by reference of Normative standards; related LOAs.

For the new standard, IEEE-SA will accept only LOAs that meet the new patent policy (shown to have additional provisions in the dark gray section). Therefore, for unexpired legacy SEPs, requests for compliant LOAs necessarily involves *additional binding concessions* by legacy SEP holders (including those previously made to IEEE), solely for incorporating such legacy standards by reference as normative in the new IEEE standard. Fig. 3 shows these as “Requested new LOA for legacy SEPs.”

Now the problem is clear: the legacy SEP holder—and the IEEE standard working group—are in a box. If the SEP holder pledges new FRAND commitments with the requisite additional concessions to the new IEEE standard implementers, it would do so by necessarily offering to grant them *more favorable license terms* than those granted under the legacy FRAND commitment to the legacy implementers for using the same SEP to implement the same standard. Thus, the legacy SEP holder *would be discriminating* against the legacy implementers, in violation of its pledge under the legacy FRAND commitment to license under nondiscriminatory terms. This is depicted by the dashed line in Fig. 3.

That such shift in FRAND commitment by a SEP owner would violate its “nondiscriminatory” obligations to licensees under a legacy LOA is confirmed by a court in India in the case of *Ericsson v. Intex Technologies, Ltd.* The court found that should a SEP holder set a royalty based on the chip value (as may be required under the new IEEE policy) after it had used the end-product value (as under the old IEEE policy, and the policy of other SDOs), it would be discriminating against prior licensees under the FRAND commitment in the legacy LOA.¹⁸

To avoid such discrimination, a SEP holder willing to submit a new LOA to IEEE may also have to reopen the license contracts with legacy implementers to reduce their royalty rates in conformance with the new IEEE royalty rate valuation, and possibly waive the right to injunction. However, reasonable SEP holders are unlikely to initiate such disruptive renegotiations.

This disturbing intractable outcome is due to the inevitable disparity between disharmonious rights of licensees under disharmonious FRAND commitments. The violation of the FRAND Harmony Principle by the 2015 IEEE patent policy impedes the ability of IEEE standards working groups to incorporate as normative other standards by reference. To be sure, no conflict or problem arises for legacy LOAs pledged under a royalty-free commitment, as those are trivially harmonious with the new IEEE policy which continues to provide for a royalty-free licensing option.

Table 1 below shows a sample of some new draft IEEE standards projects incorporating normative reference standards of ISO/IEC and IEEE. For example, the draft standard P802.11ai, “Amendment – Fast Initial Link Setup,” defines modifications to the IEEE-802.11 standard to enable a fast initial link set-up of stations by using rapid access point/network discovery and secure authentication having elements previously developed in ISO/IEC-14888-3 [38]. This

¹⁸ *Ericsson v. Intex Technologies, Ltd.* The High Court of Delhi, Case CS(OS) No. 1045/2014, p.250, March 13, 2015. At [http://op.bna.com/der.nsf/id/tbay-9uwngw/\\$File/Ericsson%20vs%20Intex.pdf](http://op.bna.com/der.nsf/id/tbay-9uwngw/$File/Ericsson%20vs%20Intex.pdf)

TABLE 1. EXAMPLE OF NEW DRAFT IEEE STANDARDS AND SAMPLE OF NORMATIVE STANDARDS INCORPORATED BY REFERENCE THEREIN, AND RESPECTIVE SEP HOLDERS FOR SUCH REFERENCE STANDARDS

Draft IEEE Standard	Normative reference standard	Declared SEP holders in the normative reference standards
P802.11ai	ISO/IEC 14888-3	Nippon Telegraph & Telephone (NTT); Certicom (RIM).
P802.15.9	IEEE-802.15.4	Intel; Philips; Integrated Programmable Communications; Motorola; Dr. Wolf Wireless, GmbH; and DecaWave Ltd.
	IEEE-802.15.7	Certicom; ETRI; Intel; and Samsung
P802.21d	IEEE-802.1AR	Certicom; Intel; and Broadcom

Sources: <http://standards.ieee.org/about/sasb/patcom/patents.html>; www.iso.org.

feature becomes more important for reliable and uninterrupted handoff of mobile Wi-Fi devices. The rapid authentication employs a discrete logarithm and elliptic curve-based mechanisms, technologies in which NTT and Certicom had declared essential patents. If IEEE has no Accepted LOAs by these SEP owners for 802.11ai, even if they wished, they will be practically unable to provide such FRAND assurances under the 2015 IEEE-SA patent policy because by doing so, they would be bound to license implementers of 802.11ai under materially more favorable terms than those committed to implementers of the ISO/IEC standard, thereby potentially breaching their prior nondiscriminatory licensing obligations.

No such conflict had arisen in the past because under prior FRAND Harmony, the FRAND requirements imposed identical constraints across SDOs and across multiple revisions of their patent policies. Previously-submitted legacy LOAs (whether royalty-bearing or royalty-free) were proper legal instruments that working groups could rely upon when previously promulgating an IEEE standard, as shown in Fig. 1. Not so under the 2015 IEEE patent policy for royalty-bearing FRAND commitments.

D. Conflicts in rolling-up standard amendments into new standard revisions

IEEE-SA maintains technical standards by rolling-up published amendments to standards into later revisions of the standard. For example, IEEE-802.11mc is a roll-up of IEEE-802.11 (2012) with the 'aa', 'ac', 'ad', 'ae', and 'af' amendments to be published as IEEE-802.11 (2016) in about March 2016. According to the SASB Operations Manual at §6.3.5, when a new revision is rolled-up, the working group Chair must initiate a request for new LOAs from SEP holders when re-using portions of an existing IEEE Standard in a different IEEE Standard. These new LOAs must be in accordance with the latest patent policy, which would require the SEP holders to make additional concessions in a new LOA. Unfortunately, because the IEEE patent policy at the time of the roll-up would be FRAND-disharmonious with the policy applicable when the previous LOAs were pledged, for reasons explained in III.C, updated LOAs from respective SEP holders would likely not be forthcoming. It thus appears that the SASB will have to make a fateful decision—to approve IEEE-802.11 (2016) without having LOAs compliant with the 2015 IEEE patent policy, thereby creating two classes of SEP owners and subjecting implementers to different licensing regimes for the same standard, or withhold adoption of the rolled-up standard. Neither option appears satisfactory.

E. Will IEEE standards discriminantly exclude certain SEP holders' technology?

As explained above, due to FRAND disharmony, new IEEE standards may be adopted without actually obtaining LOAs compliant with the 2015 IEEE patent policy from holders of patents that are *known to have been declared essential* to such new standards. These scenarios would involve patents essential for normative standards incorporated by reference in, or previous amendments rolled up into, new IEEE standards. These scenarios are not merely hypothetical—they are more likely to occur than the alternative disapproval of the standard by the IEEE SASB for want of compliant LOAs for legacy SEPs. Yet, the IEEE SASB may disapprove a new standard having *new* features covered by a *new* SEP for which no compliant LOA is made available. Alternatively, IEEE standards working groups may consider adopting technical solutions designing-around the new SEP. Such is the proposed resolution of the impasse at the IEEE-802.11ah project described in II.A. In so doing, these working groups would be creating a double standard with respect to known patented technologies for which no compliant LOA is on file: those that will be designed-around and excluded from the standard *due to* the lack of compliant LOAs, and those that will be included in the standard *despite* the lack of compliant LOAs. The 2015 IEEE patent policy makes no distinction among “Essential Patent Claims” that require LOAs. If IEEE standards working groups engage in such discriminatory exclusion practice, or if the IEEE SASB distinguishes between new SEPs and normative reference SEPs in approving standards for which no compliant LOA for a *known* SEP is on file, it may trigger substantial antitrust concerns. These concerns would arise directly from selective application of the 2015 IEEE patent policy.

IV. CONCLUSION

Various SDOs have patent policies that differ substantially in the rules of disclosure, SEP declarations, transferability of obligations, and dispute resolution. However, FRAND licensing obligations and constraints have consistently been *essentially identical* across SDOs. When an SDO attempts to deviate from this *de facto* industry standard of FRAND Harmony, it does so at its own peril. Such deviations inevitably lead to inability to build new standards on established patented technologies of other standards; disrupt the process of rolling-up previous versions of a standard into a new standard; and may induce discrimination among SEP holders in adopting their technologies in IEEE standards. IEEE-SA has embarked on such adventurous journey of FRAND disharmony but this author predicts that it will soon realize the perils of over-defining FRAND, just as ETSI realized 21 years ago, and reversed course.

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