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Navigating Standard Essential Patents in the 5G and IoT Era: Legal Challenges and the Way Forward

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5G communication networks and IoT technologies are revolutionising the global digital infrastructure, providing interconnectedness, quicker data transfer, and intelligence-driven automation. However, this technology leap is accompanied with high legal and regulatory complexities — most notably around Standard Essential Patents (SEP) licensing and SEPs enforcement. SEPs are patents that are essential to implementing a technical standard and therefore are subject to a duty to licence on fair, reasonable and non-discriminatory (FRAND) terms. With the rapid development of digital ecosystems, there is a growing tension in the legal and economic balance between patent protection and open access to standards.

The paper reviews the changing jurisprudence and legal regimes related to SEPs and FRAND licensing obligations in key jurisdictions such as the European Union, UK and India. Commentary at the jurisdictional level, including the EU and UK, highlights constructive negotiation frameworks while right to extract licensing (*Huawei* v *ZTE*) good faith approaches, alongside US antitrust scrutiny and contractual enforcement. Despite numerous high-stakes SEP litigations and competition law interventions in India, the lack of a clear regulatory framework has caused uncertainty among stakeholders in the country.

The paper will briefly identify and analyse the primary challenges of SEP enforcement, including royalty stacking, patent hold-up and hold-out, forum shopping on a global scale, and different applications of FRAND, among others. It pays special attention to the Indian scenario, specifically focusing on recent judicial developments and the interplay of the Patents Act, 1970, the Competition Act, 2002, and the overall policy vacuum surrounding regulation of SEPs. The role of SSOs and their contracts is also part of the analysis.

By analyzing SEP licensing practices through a comparative legal lens, the paper highlights the alarming divergence of approaches to SEPs and thus argues for the harmonization of SEP licensing practices and offers policy recommendations to ensure equitable access to standardized technologies while creating relevant incentives for innovation. The results imply that India must take steps towards a streamlined SEP licensing policy, ascertain legal standards on FRAND negotiations and incentivize alternative dispute resolution in SEP disputes. These rules will be crucial in improving legal certainty and creating a fairer innovation system for 5G and IoT.

Keywords: Standard Essential Patents, 5G, IoT, FRAND Licensing, SEP Enforcement, Patent Injunctions, Competition Law, India

The intersection of 5G technology and the IoT has heralded a new era of mass digital transformation that continues to disrupt industries, public services, and consumer ecosystems around the world. With the rapid evolution towards smart infrastructure and connected devices, autonomous systems, and advanced communication networks, the dependency on standardised technologies has been crucial. The soul of these technological standards is Standard Essential Patents (SEPs)[2]— patents which could claim those inventions, without which it could be impossible to execute compliance with a certain technical standard.[1] Declare these Patents to Standard Setting Organizations (SSOs), European Telecommunications Standards Institute (ETSI) etc that would be essential for the implementation e.g. 5G NR (New Radio), LTE, Wi-Fi etc.

SSOs usually require patent holders to agree to licensing on Fair, Reasonable, and Non-Discriminatory (FRAND) terms so that SEP holders do not exercise monopolistic power.[3] FRAND commitments aim at balancing various interests among SEP holders and implementers in the ICT sector, the latter not only requiring access to the technology on reasonable terms but also ensuring maximum propagation of the standardised technologies so that it fosters innovation and interoperability between different industries.

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Nonetheless, the absence of a universal legal definition of what is "fair," "reasonable" or "non-discriminatory" has given rise to tremendous litigation, regulatory involvement and cross-border conflicts.[4]

At the heart of the SEP discourse is the tension/reciprocal conflict between the principles of exclusivity under patent law on the one hand, and access under competition law on the other.[5] The SEP holds legal exclusivity over the invention, yet for implementers to access the market, they would need access to the SEP. This is a breeding ground for SEP strategic behaviours—theoretical "hold-up" by SEP holders, who may demand exorbitant royalties or even injunctive relief after implementers have committed to a standard, and practical "hold-out" by implementers who may drag out negotiations or use the patented technology without timely obtaining a licence.[6]

Countries adoption of SEP-FRAND approach has been different to one another. As the landmark *Huawei* v *ZTE* judgment[7] shows, the EU model relies on competition law-based principles in articulating its legal reasoning. The pendulum of aggressive antitrust scrutiny has swung back to a patent-holder friendly position, most recently as a result of *FTC* v *Qualcomm*.[8] China has quietly become a jurisdiction that sets global FRAND rates and issues anti-suit injunctions to prevent parallel litigation in other jurisdictions.[9] In contrast, India's legal position is still nascent and fragmented, with SEP jurisprudence developing primarily through ad hoc litigation, and without a codified policy or statutory framework.[10]

Considering the strategic nature of 5G and IoT technologies to India's digital and industrial future, crafting a coherent legal and policy framework on SEPs is not just a matter of legal nicety, but a pressing necessity to secure technological sovereignty, market competitiveness, equitable and innovation for all.

Understanding SEPs and the Global FRAND Dilemma

The basic principles that regulate SEPs and the operation of SSOs and analyzes the practical challenges that are related to the implementation of FRAND licensing—the most important legal tool, which is supposed to guarantee equitable access to standardized technology in the era of 5G and IoT.

What Makes a Patent "Standard Essential"?

Standard-Essential Patent (SEP) is a patent that claims an invention that must be used to comply with a particular standard.[11] That is to say, one must use the patented technology to comply with the standard. As a result, anyone trying to produce, sell or implement a product compliant with such a standard now would have to take the license from the SEP holder or face the risk of patent infringement.[12] This legal necessity of reliance on SEPs places them in a unique position as compared to other types of IP rights in the larger ecosystem.

SEPs are particularly important in sectors with strict interoperability and network effects such as Wireless communications (4G LTE, 5G NR etc.), Media Codecs (such as MPEG-4, HEVC, AV1), Internet of Things (IoT) standards, such as, NB-IoT, Zigbee, and LoRaWAN. These are not just technical specifications, they are a lingua franca through which digital technologies and networks communicate across the globe. Through the incorporation of patented technology into these standards, the patent owner's technology is essential to manufacturers and developers throughout the supply chain – starting from chipset vendors and software developers to end device manufacturers and service providers.[13]

Standardisation and Market Access

Standardization is intended to help prevent fragmentation and maintain compatibility, and it should also speed up progress. But once a patent is declared as essential to a standard, it operates as a bottleneck to the market. SEP holders gain such a near-monopolistic position—not through market power in the conventional antitrust sense, but rather through the structural necessity imposed by standard adoption.[14]

This situation has major legal and financial consequences, including:

(i) Discriminatory Licensing: The SEP owner may refuse to deal with potential rivals which will lead to their exclusion from the market in practice.

(ii) Royalty Abuse: It turns out that if you have the market power to make someone license your patented technology, you can set crazy-high royalties rates, especially when "reasonable" and "fair" are not clearly defined terms.[13]

(iii) Patent Hold-Up: When a SEP holder delays licensing until the standard has been established and is being widely used and then asserts its patent rights to demand a higher royalty, taking advantage of the fact that

implementers are locked into a technology choice.

(iv) Patent HoldOut: It is also possible for a SEP Implementer to drag his feet on licensing terms with no intention of doing so for the patent at hand because he wants to avoid paying any money or take advantage of other litigation induced oppress—the returns on SEP Holder's investments in innovation.

SEP Statement and Essentiality Test

If a business thinks it owns a patent which is essential to a standard, it notifies that to the relevant SSO during the standard setting process. This announcement most commonly is followed with an assurance to license the SEP on FRAND terms.

Nevertheless, a significant shortcoming is the absence of independent essentiality verification. SSOs rarely, if ever, require confirmation of essentiality of a claimed patent. Therefore, it might be the case that firms overstate their patents (in the sense of declaring to have patents) and over-value their patent portfolio, and also have the potential to abuse the system in order to exclude competition.

Independent and third-party essentiality checks (such as those carried out by patent pools and SSO committees) remain rare, although discussions for (policy) reform have increasingly raised their potential importance in the increasing of transparency and the lowering of bilateral transaction costs (in particular in the EU and Japan).[15]

Intersection of SEPs and Public Interest

Given that SEPs are fundamental to not just the core public infrastructure but also to consumer technology (for example smartphones, medical devices, autonomous vehicles), the issue of access to technology raises broader public interest and interest in access to innovation. Courts and regulators, meanwhile, are coming to the realization that SEP disputes cannot be viewed purely as a matter of private patent law, but that they are bound to take into account[16]:

(i) Consumer welfare
(ii) National systems of innovation
(iii) Trade competitiveness
(iv) Targets for digital public infrastructure

This in turn has led to greater avouchment scrutiny of SEPs, especially in the context of cross-border litigation in which courts might vary in their judgment on whether patents are essential, or licensing terms are fair. For example, we now have Chinese and Indian courts claiming jurisdiction over worldwide RAND rates and European enforcers focused on the competitive harms of SEP-based injunctions.

The Rationale behind FRAND Commitments

In order to restrain the monopolistic power of SEPs, SSOs impose an obligation that the owner of the SEPs should issue a license to the SEPs on Fair, Reasonable and Non-Discriminatory (FRAND) terms. But there is no uniform definition or enforcement of the FRAND commitment across jurisdictions.[17]

- Fair is that the provisions be on the reciprocal basis, as set under good faith, equality of bargaining power, and absence of abuse.
- Reasonable means the cost for using the technology as well as paying for the patent, not adding to the costs of the patent by also including it in the standard.
- Non-Discriminatory calls for equal treatment of persons in positions similar to the licensees, prohibiting royalties or refusals of causes.

FRAND is meant to strike a balance between incentives to innovate for SEP owners, and market access and interoperability for implementers. Nevertheless, since FRAND is often defined unilaterally by private contractual undertakings to SSOs, and not by legislated norms, there remains substantial legal incongruity internationally as such ambiguity affords SSOs varying legal treatment globally.

Licensing Challenges in Practice

While the FRAND regime is theoretically aimed to achieve an equilibrium between incentives to innovate for SEP holders and access and fairness for technology implementers, in practice it is fraught with uncertainties, contradictions and systemic problems. These concerns result in lengthy litigation, uncertain markets, and prolonged regulatory interference. Key challenges include:

Over-Declaration and Patent Thickets of SEPs

One of the most widespread issues is over-declaration, in which companies provide Standard Setting Organizations (SSOs) with declarations of hundreds of patents as "essential" without sufficient technical justification and independent verification. This practice creates[18]:

(i) Patent thickets: Complex arrangements of overlapping and unclearly valuable patents

that make licensing negotiations difficult and act as obstacles to entry to the marketplace, especially for SMEs and start-ups.

(ii) Strategic inflation: Firms might exaggerate the size of their SEP portfolios to increase their bargaining power or to receive cross-licensing benefits including making claims a large number of declared patents that turn out to be non-essential later.

The lack of compulsory essentiality checks leaves room for companies to game the system. Several SSOs and pools have moved to introduced voluntary third-party essentiality assessment programs (e.g., through independent evaluators or AI-assisted tools), but there remains to date no unified, international, enforced approach to assessing essentiality. The lack of legal foundation can also provoke rent-seeking behaviour and undermines the credibility of SEP declaration.

Royalty Layering and Economic Viability

In multi-technology standards, such as 5G, a single product may have even hundreds or thousands of SEPs from dozens of organizations incorporated. For this reason, it is possible that each SEP holder can request a license fee and thereby creates royalty stacking – the siting of several multiple licensors' royalty.[19]

Key implications include:

(i) Cost: Increasing combined royalties to such a degree that they reach or exceed a sizable portion of the device price make it economically impractical for companies—particularly those that create low-margin or volume products—to innovate or compete.

(ii) Market exclusion disincentive: Startups and regional manufacturers might avoid moving into SEP-dense markets amid uncertainty over total royalty payments, resulting in entrenched incumbents and a lack of worldwide innovation diversity.

Courts and regulators have been aware of this. In *Unwired Planet* v *Huawei*[20] (UK), the court sought to establish global portfolio rates so that there would be no negotiations taken piece by piece, or accumulating royalties demanded. But these endeavours are not without extra-terrestrial/jurisdiction and global-license enforceability considerations.

Disagreements Regarding Royalty Base and Method of Valuation

Establishing what is a reasonable royalty base is among the most litigated parts of SEP licensing. The key division is actually between:[21]

(i) SEP holders, who are generally pro-EMVR —determining royalties in proportion to a final product (e.g., smartphone, smart TV).

(ii) Implementers, for highest saleable patent-practicing unit (SSPPU) (a specific portion of a product that includes the patented technology (e.g., modem chip or baseband processor)) as the royalty base.

Trends in Law differ by Jurisdiction

(i) U.S.: U.S. courts generally have not applied EMVR to SEPs due to concerns that doing so would cause demand for excessive royalties on non-patented features (e.g., *LaserDynamics* v *Quanta Computer*[22]). The SSPPU approach has always been the favored method of the Federal Circuit.

(ii) China: In cases such as *Huawei* v *Conversant*[23], Chinese courts have been granting worldwide licensing rates and indicated that they are open to calculating a royalty fee through a global patent portfolio evaluation including the commercial value of the end-product.

(iii) India: It should be said that the royalty base has not been conclusively resolved in the Indian courts. In the *Ericsson* v *Micromax*[24] *saga*, the Delhi High Court issued interim injunctions at royalty rates determined ad hoc indicating no principled framework.

(iv) EU: *CJEU 's Huawei* v *ZTE*[7] ruling indirectly accepted that FRAND needed objective / reasonable valuation – didn't say how to calculate royalty base though.

Such contradictory norms lead to serious regulatory fragmentation, higher compliance costs, and forum shopping by suitors.

Opacity of SEP Databases and License Terms

One of the biggest obstacles to fair negotiations and dispute resolution is the lack of transparency when it comes to SEPs and FRAND terms:

(i) Absence of a centralized Global Registry: Even if organizations like ETSI and other SSOs publish the SEP declarations publicly as a matter of policy, they are not tested for their essentiality, validity or their status with respect to expiry.

(ii) Lack of promulgation of licensing terms: A majority of FRAND licences are confidentially negotiated which makes it hard

for new entrants to use existing agreements as a benchmark as what exactly may be the "non-discriminatory" terms. "That makes it harder for regulators to catch abuse or discrimination," she said.

(iii) Asymmetrical information: large SEP holders typically have much more information and negotiation power than small implementers, leading to an unequitable situation that FRAND sought to avoid.

Attempts to remedy this have included the European Commission's proposals to create transparency platforms and databases of SEP holders with verified SEPs and geniculate licenses. But these ideas are still early and opposed by the business interests with which they have relationships who want to keep things bilateral and private.

The Institutional Role of SSOs

Standard Setting Organizations (SSOs) are in a significant but limited role in the governance of SEPs. These entities have a role in structuring the procedural and policy framework for the incorporation of patented technology into standards. They play a key role in ensuring that members who have made a technology available as part of a standard must agree to license their SEPs on Fair, Reasonable, and Non-Discriminatory (FRAND) terms.[25] The SSOs for their part rarely if ever follow through on such commitments or test the necessity of declared patents. Their role is still more to facilitate rather than arbitrate.

For example, in the EU, the European Telecommunications Standards Institute (ETSI) mandates that SEP owners have to make a public statement about their patents and provide FRAND assurances. But it does not assess whether the patents are genuinely essential and does not oversee what the royalty rate should be.[26] IEEE did the opposite; it actually changed its patent policy to have more license clarity back in 2015. The updated policy focused on the SSPPU as a base for royalties and discouraged the seeking of injunctive relief against licensees who are open to negotiate in good faith. Meanwhile, the 3rd Generation Partnership Project (3GPP), which is not an SSO in the formal legal sense, functions as a key technical organization within ETSI.[27] It is influential in the development of telecommunications standards, including LTE and 5G NR, but doesn't actually offer any direct licensing guidance or oversight.

Tracing SSO activity, patent pools and platform-based collective licensing models (MPEG LA, Avanci) have developed.[28] Those mechanisms are intended to make the licensing process more efficient, by pooling patents and providing implementers with a single place from which to obtain access to standardized technology. Such models theoretically aid in the spread of innovation by lowering transaction costs and negotiation costs. However, they have sometimes fallen under the watchful eye of competition authorities, especially in cases of allegations of anti-competitive behaviour, such as cartel pricing, abusive licensing and exclusion of certain market participants.[29]

A further controversial issue in the SEPs enforcement sphere is the possibility and fit of injunction remedies. Though IP rights holders traditionally ask for injunctions to stop unauthorized use of IP, SEP disputes are further complicated by FRAND obligations.[30] Rise of other wrap around considerations across multiple jurisdictions Finally, in various jurisdictions, including Europe and India, courts and regulators now also increasingly look at whether an injunction is in the public interest and respects the obligations of fair and non-discriminatory licensing — or amounts to an abuse of dominance.

In the EU, the CJEU's *Huawei* v *ZTE*[7] ruling of 2015 provided a framework. The court stressed that injunctions should not be granted as of course but "only after the parties have made good faith attempts at negotiations. This decision has had its impact on courts around Europe as a sense check mechanism for injunctive relief and licensing in SEP cases. In the United States, after the Supreme Court's decision in *eBay Inc.* v *MercExchange*[31], courts have become more reluctant to grant injunctions, except where serious circumstances of irreparable harm are present, and monetary damages would be inadequate (nothing to do with the video's profits).

In China, the courts have taken a broader view. This case, along with other similar cases such as *Huawei* v *Conversant*[23] indicate a developing trend for the Chinese courts to grant an anti-suit injunction and to decide on international royalty rates. This shows China's growing assertiveness in developing global SEP jurisprudence, especially taking into consideration that her domestic companies are now the dominant SEP holders. In India, however, adoption is quite uneven in respect of SEP enforcement. Courts have issued such interim

injunction orders in cases such as Ericsson v. Micromax & Intex, often based on confidential license agreements and without an articulated policy framework on SEP licensing and FRAND interpretation. This ad hoc approach highlights the necessity of a more robust and predictable judicial or legislative framework in the Indian context.

On the whole, it is not entirely clear that while these SSOs, and licensing intermediaries, have taken steps towards opening the door to SEPs in recent years, they have all made it across the finish line. What If It's Done That Way in Europe? Courts throughout the world struggle with how to reconcile domestic patent rights and domestic competition policy with the spread of innovation—in the digital era, when all the aggregation-ready "following the standard" gets done in Asia.

International Perspective

European Union

The country that developed one of the most detailed and comprehensive frameworks to deal with legal disputes about SEPs and FRAND obligations is the European Union (EU). The EU does not have a single body of law that is dedicated to SEPs or FRAND, but rather such issues of law intersect with competition law, contractual principles, and judicial doctrines (notably under the Treaty of the Functioning of the European Union (TFEU)).

Article 102 TFEU and the EC Competition Law

The EU's legal strategy is based on Article 102 of the TFEU, which bans the abuse of dominant position.[32] Where an SEP holder is unwilling to license on Fair, Reasonable and Non-Discriminatory (FRAND) terms or is seeking an injunction and/or an excessively high royalty rate which have the effect of restricting market access, such conduct could be considered abusive and in breach of Article 102. It has been strengthened by cases such as *IMS Health GmbH & Co. OHG* v *NDC Health GmbH & Co. KG*[33] and subsequently extended to the context of SEPs.

The first standard essential patents' and injunctions' case referred to the CJEU was the *Huawei* v *ZTE*[7] case in Germany. The CJEU's landmark judgment in Huawei Technologies Co. Ltd v ZTE Corp. (Case C-170/13) introduced a detailed legal test for the enforcement of SEPs in the EU for the first time. The CJEU elaborated a "safe harbour" approach to ascertain whether a SEP owner's request for an injunction is compliant with competition law. The framework requires:

(i) The SEP proprietor to notify the defendant and offer a written FRAND license proposal.
(ii) The alleged infringer should act quickly, indicating a willingness to engage in good faith negotiations.
(iii) If the talks break down, the transparency is mutual: both parties should make counteroffers and explain why they reject a new offer.

Failure to satisfy these conditions may lead the SEP holder's application for an injunction to be abusive pursuant to Article 102. As such, the *Huawei* v *ZTE*[7] ruling prefers debate to litigation and places competition law at the service of limiting abuse of market power as the result of standardization.

In the last years, the European Commission has raised attention to the opaqueness and fragmentation of SEP licensing, especially in fast-moving markets like IoT and connected cars.[34] In December 2022, the Commission issued a proposal for a regulation concerning SEPs, with the objectives of[35]:

(i) Establishing a single register for SEPs in EUIPO.
(ii) Mandating an under-taker operator compatibility test by an independent third party for declared SEPs.
(iii) Introduce a FRAND determination mechanism: non-binding expert opinions on licensing terms which should help to avoid litigation.
(iv) Facilitating Transparency in SEP Portfolios, Licensing Deals, and Royalty Rates.

At a time when it is still subject to debate in the EU's lawmaking bodies, the proposed regulation is indicative of the bloc's desire to shape the governance of SEP licensing and also go from a voluntary, standards-organization-driven framework to a quasi-regulated one.

United Kingdom

Post-Brexit, the UK has been developing, yet increasingly setting its own direction, in SEP regulation by applying case law principles, patent law, and competition policy, and its courts.

In *Unwired Planet* v *Huawei*[20], the UK Supreme Court clarified the approach to FRAND licensing. The judgment of the UK Supreme Court is one of the major, historic rulings of global importance in SEP jurisprudence. The Court held that:

UK courts were competent to decide the rates for a global FRAND license, regardless of the patent portfolio originating from several jurisdictions. A licensee having hold-up should consent to worldwide licensing where the SEP holder's portfolio is put to international use. An injunction may issue to an implementer who refuses a license on FRAND terms set by the Court.

This decision placed the UK on the map as a forum of choice for international SEP litigation, in particular for SEP owners seeking to have the terms of a royalty-bearing licence set by the court. It also strengthened the willing licensee standard, indicating that an obdurate implementer of the standard's technology may be subject to injunction if it evades or frustrates licensing discussions.

In *InterDigital* v *Lenovo*[36], the UK High Court applied the Unwired Planet principles. The court also favored this top-down approach to FRAND rates, which involves calculating the overall aggregate royalty burden for a standard and then apportioning it to the SEP holder by the percentage of essential patents it owns. It also sounded in non-discrimination, noting that FRAND does not mean that all licensees must have exactly the same licensing terms, but differences must be objectively justified.

UKIPO Consultations and Policy Directions

Unlike the EU proposal, the UK does not yet have an SEP-specific law or regulations, but the UK Intellectual Property Office (UKIPO) is considering initiating consultations in order to determine whether a more formal system of SEP licensing should be adopted. Stakeholders have debated[37]:

(i) Whether the UK should establish a public register of declared SEPs.
(ii) Whether fundamental reviews (of essentiality) should be mandatory?
(iii) The administration of a FRAND rate.

There are two mature but developing models for the regulation of SEPs and FRAND licensing: that within the European Union and that in the United Kingdom. Whereas the EU prefers the collective approach of regulation synchronisation and institutional control, the UK has continued to employ judicial enforcement and contract, with the courts taking an assertive role in the global licensing adjudication. Together, they are establishing global precedents, but their different ways forward demonstrate the urgency of global coordination—as 5G, IoT, and AI-enabled systems and environments increasingly rely on fair, transparent, and inclusive standards processes.

Indian Position on SEPs

India's policy on Standard Essential Patents (SEPs) and Fair, Reasonable, and Non-Discriminatory (FRAND) licensing is nearly completely jurisprudential, devoid of the support of a statutory regime.[38] Although there is no specific law relating to SEPs, nor any legislation pertaining to FRAND commitments, SEPs and FRAND commitment-related topics have been discussed in Indian courts and by the regulatory authorities under some provisions of the *Indian Patent Act* and the *Indian Competition Act.* With India increasingly being seen as a global powerhouse for mobile technology manufacturing and digital infrastructure where, there is a need for greater clarity in the governance relating to SEPs. Yet the existing legal system is a patchwork of litigation-driven expansion, regulatory ambivalence, and a void in policy.

Case Law Precedents and Courts' Findings

The Indian SEP case law has emanated primarily from the Delhi High Court. The most famous disputes include *Telefonaktiebolaget LM Ericsson* v *Micromax Informatics Ltd*.[24] and *Ericsson* v *Intex Technologies*[39], where Ericsson, the SEPs owner, was trying to assert its SEPs, which claims against Indian device manufacturer involved 2G, 3G and 4G standard essential patents (SEPs). The court issued an order granting the interim injunctions and requiring the defendants to pay an interim royalty rate, which was determined based on the existing global licensing prices of Ericsson.

These were some of the first cases to introduce the concept of FRAND obligations into the Indian courts. But they also indicated judicial uneasiness with establishing the royalty rates or determining technical essentiality. The Indian courts did not conduct a detailed FRAND analysis or assess the proper royalty base but rather based on Ericsson's past licensing practices set interim rates.

Conversely, Ericsson also had its licensing practices challenged before the CCI by Micromax and Intex, which accused it of exercising dominance in the standard essential patents market by charging excessive and discriminatory royalties and claiming royalties should be calculated on the basis of the cost of entire device. The CCI had ordered an anti-trust probe *under Section 4 of the Competition Act* (abuse of dominance).

However, when it came to *Telefonaktiebolaget LM Ericsson* v *Competition Commission of India*[40], the Delhi High Court did come to the interim conclusion and stayed the investigation of CCI has led to a tussle of jurisdiction between patent law and competition law. The court asked if the CCI had jurisdiction to scrutinize licensing practices of a patentee, as that was a domain as per practice traditionally followed which is within the aegis of the Patents Act, 1970. This provoked an unresolved legal puzzle, putting in limbo for implementers whether competition law remedies may apply in SEP disputes.

Significance of the Competition Act, 2002

The Competition Act 2002, in particular Section 4 has developed as a juridical weapon for implementers to resist what they view as the abusive licensing requests of SEP holders. Article 4(2) prevents the abuse of dominance, and Indian producers have accused SEP holders of making unfounded use of their standard-essential nature in order to extract excessive remuneration, impose other restrictive terms, and refuse to license technology on reasonable terms.[41]

While the CCI has indicated prima facie apprehensions of anti-competitive practices in the licensing of SEPs, the lack of authoritative judicial direction has been the main issue creating hurdles for the operational enforcement of competition law in the domain. Further, it remains undefined as to when in a given scenario, the SEP licensing becomes anti-competitive in Indian context, resulting in legal uncertainty and erratic application.

Applicability of Patents Act, 1970

The Patents Act 1970 in India does not have any provision referring to SEPs or FRAND obligations. The most pertinent instrument may be *Section 84*, which makes provision for the issuance of compulsory licences in specific cases—when a patented invention is not serving the public on a reasonable scale, or when it is not worked in India.[42]

Nevertheless, *Article 84* has never been used in relation to SEPs and the applicable of it to standard-essential technologies has never been tested in the courts. Unlike in the pharmaceutical context, in which public health considerations have been invoked to support the concept of compulsory licensing, no court has yet considered whether comparable public interest or public policy considerations (e.g., widescale availability of communications technologies on reasonable terms) could cap apply to the licensing of SEPs. Consequently, the possibility of a court imposing compulsory licensing on SEPs in India is a legal uncertainty and rarely invoked in practice.

Absence of Policy and Institutional Frameworks

India, however, does not yet have any formal SEPs policy/statute; despite greater litigation and regulatory focus. During 2016 More recently, the Department for Industrial Policy and Promotion (the "DIPP") issued a Discussion Paper on SEPs and Their Availability on FRAND Terms seeking public consultations, and calling for interested parties to give suggestions on aspects including[43]:

(i) SEP database or registry developed.
(ii) The requirement to determine independence by an independent (3rd party.
(iii) Standards for adjudication of FRAND and for royalty rates.
(iv) SSOs and patent pools: Their place in SEP governance.

Though it represented a significant first step towards regulatory inquiry, the paper did not produce any binding recommendations or legal instruments. Ever since there has been no substantial policy follow-up, and India lacks any specialized institutional framework to govern the licensing of SEPs, to determine the essentiality of SEPs or to decide disputes that fall outside the four corners of a court.

India at present has a patchy, defensive legal regime when it comes to SEPs, using litigation rather than pro-active legislation to chart its course. The judiciary have been instrumental courses of early SEP enforcement, but judicial inconsistency, lack of technical essentiality review and reliance on interim measures has hampered their ability to provide clarity or precedent. The Competition Commission's efforts have been thwarted by a jurisdictional tug of war, and the Patents Act has significantly under-enforced SEP questions.

With no specific policy or regime, India's approach to SEPs is developing tentatively. Notwithstanding its goal of becoming a world leader in 5G, IoT and digital manufacturing, India must give priority to formulating clear, coherent and balanced SEP policies – those which preserve innovation incentives for patentees while facilitating the efficient and reasonable access for implementers and consumers.

Challenges in SEP Enforcement

Enforcement of FRAND licensing obligations under the structure of Standard Essential Patents (SEPs) is complex, despite these noble principles, filled with legal, economic and even jurisdictional challenges. With growing digital interdependencies around the globe, particularly within the context of transformative new technologies such as 5G, IoT and AI-driven devices, the following challenges persist to hamper the effectiveness and fairness of SEP governance.

Absence of Uniform Definition and Interpretation of FRAND

Among the most basic issues is the lack of a single, globally accepted definition of FRAND (Fair, Reasonable, and Non-Discriminatory) terms. Even though SSOs require that SEP holders submit to licensing under FRAND terms they generally do not specify what constitutes "fair," "reasonable," and "non-discriminatory." The indeterminacy of this approach leaves to national courts and arbitral tribunals the assessment of what FRAND means; they frequently reach different decisions.[44]

For instance, U.S. jurisdiction has placed strong emphasis on contract obligations and contemplative effort and frequently apply the SSPPU to prevent royalty overreach. In comparison, courts in the UK have held global portfolio licenses to be FRAND-compliant and found that variances in individual licenses between implementers are fair, if objectively justified like in the *Unwired Planet v. Huawei* case. At the same time, the EU's competition-law-oriented viewpoint –as defined in *Huawei v. ZTE* –describes FRAND more in the light of anti-competitive conduct as well as procedural negotiation obligations.

Such a piecemeal approach to FRAND offers little legal certainty to SEP holders (no clear predictability of enforcement rights) and implementers (varying obligations) that may overpay for the same pool of patents. It also causes legal forum shopping and long international judicial activity.

Royalty Stacking and Patent Thickets

Another big hurdle in SEP enforcement comes from what's known as royalty stacking -- the issue of having many SEP holders contributing rights to various components of a standardized technology all believe they're due for royalties. These royalties can aggregate to a level that makes it too costly to bring standard-compliant products to market.[45]

Adding to the complexity, patent thickets—overlapping claims in a dense forest of declared SEPs, of which many have yet to be independently confirmed as essential—plague this issue. Companies frequently over-declare patents in the standard-setting process as "essential," overstating the size of their portfolio and using it to negotiate strength, all too often on patents that will later be deemed non-essential or invalid.

"Startups, SMEs and newcomers, such as wireless IoT service providers, face an additional barrier to entry as they need to negotiate licenses with various SEP holders – sometimes with no clear indication of the prevalent rates (or confirmable essentiality) at the time the protocol is locked down – which may have the effect of stifling innovation and competition. Killing innovation, creating poor duplication of effort and concentrating the market in to the hands of a few big players. However, real world implementation of such central databases and methods for essentiality checks, as suggested by the European Commission and other actors, are still scarce.

Forum Shopping and Worldwide Royalty Rate Setting

Over the past decade, there has been a strong growth in cross-border SEP litigation, with courts in countries like the U.K., China, Germany and the U.S. increasingly willing to exercise their authority to determine global FRAND rates. This ruling, which is designed to facilitate dispute resolution and prevent fragmented settlement negotiations, has also led to the phenomenon of forum shopping—that is, litigants selecting forums they believe to be more sympathetic to their cause.[46]

For example, in *Unwired Planet v. Huawei*, the UK Supreme Court confirmed that the English court has the power to determine the FRAND licensing terms on a global basis even for patents not litigated in the UK. In *Huawei v. Conversant*, Chinese courts granted antisuit injunctions to stop enforcement in other jurisdiction of generic rulings regarding SEPs and claiming so the power to determine worldwide rates. In turn, both German and Indian courts have granted anti-anti-suit injunctions, resulting in a confusing web of conflicting orders and enforcement challenges.

Such escalation of jurisdictional conflict is contrary to the cool, and clear goal of global standards, inefficient for enforcement, and uncertainty for SEP holders and implementers. It also puts severe pressure on judicial cooperation and reciprocity in cross-border decisions enforcement.

Injunctions v Innovation and Public Interest

The availability of injunctions in SEP cases – in particular against implementers presenting themselves as willing licensees – raises the difficult conundrum of balancing patent protection against technology access and innovation. In the past, patent law permits patents owners to request injunction against infringers. Yet SEPs are unavoidable because they are inherent in standards, and issuing injunctions may have disproportionate consequences, particularly when the accused infringer is willing to negotiate in good faith.[47] Courts must then balance:

- In the EU, the *Huawei* v *ZTE* contains a test that allows injunctions only when the implementer does not negotiate in good faith. Courts in the US since the *eBay* v *MercExchange* case have been, particularly in cases that are accompanied with damage suits, hesitant to issue injunction for SEP.[48]
- In India and China, however, the status is still unsettled. Indian courts have also awarded interim injunctions (*Ericsson* v *Intex,* for example) without definitively deciding if the terms offered were FRAND or not and in one instance. Chinese courts have also granted injunctions even when global royalty negotiations were ongoing.

Such unpredictability also has a deterrent effect on innovation, especially for employers in jurisdictions without regular procedural safeguards or in courts that grant sweeping relief without scrutiny. It also threatens to fragment global access to technologies — the polar opposite of what standards are intended to achieve.

The prosecution of SEPs, which is important for realizing the Return on Innovation, suffers from non-uniformity around the world, information asymmetries, and procedural overhead. From the ambiguity of FRAND to the rise of jurisdiction-hopping injunctions and worldwide rate-setting, SEP litigation is a microcosm of the conflict between private right and public utility in the interconnected digital age.

Responding to these challenges will not only demand judicial deference but patience and cooperation among regulators, licensing transparency and multilateral regulatory coordination, and the development of institutional dispute-settlement mechanisms that prioritize access, efficiency, and fairness. In the absence of reform, the SEP landscape could start to inhibit rather than promote incentives for technological development.

Conclusion

The development of SEPs and the FRAND system is at the crossroad of law, technology and global economic policy. "When the world depends more and more on standardized technology to drive the next wave of innovation – in autonomous vehicles and AI-enabled health care systems, in smart cities and digital infrastructure – such access will represent not only a business challenge, but a public interest imperative," they added.

This paper has shown that, whereas the model of FRAND is perceived to be one acting at the cutting edge of finding a balance between stimulating innovation and guaranteeing access, the enforcement of FRAND at both national and supra national level appears creaky, murky and, often, insufficiently developed. Problems such as royalty stacking, forum shopping, absence of essentiality checks, and divergent attitudes towards injunctions still disturb the ideal of a harmony globalisation.

For these reasons, a forward-thinking, multi-faceted approach is needed – one that is practical, creative, and jurisdiction-specific, as well as responsive to new technology and markets.

Institutionalization of Essentiality: Global SEP Observatory Formation

In order to remedy this lack of transparency and over-declaration of SEPs, a Global SEP Observatory should be launched under like WIPO or in cooperation with standard setting bodies. This body could:

(i) Keep a public, searchable database of declared SEPs.

(ii) Enable independent assessments of essentiality with technical experts and AI-based patent analysis.

(iii) Provide platform for publishing of the license terms and to get the benchmarking of the market, as much as possible.

Not only would this indubitably increase transparency, but it would also establish a soft-law instrument for coordinating procedures between the different national coloured registries (without harming national sovereignty).

Smart Licensing Infrastructure: Blockchain and FRAND Integration

SEPs licensing in the age of digital transformation should no longer rest of bilateral opaque deals. Governments and international organisations also

need to consider the establishment of FRAND licensing registries built on Blockchain networks, helping to:

(i) Handle royalties via smart contacts.
(ii) Normalize licensing processes among jurisdictions and sectors.
(iii) To avoid discrimination, require algorithmic transparency in licensing terms offered to different implementers.
(iv) It would also facilitate real-time compliance auditing for regulators, while lowering transaction costs for small startups and SMEs—a critical move in the direction toward the democratization of standards.

Reforms with an International Perspective

For developing countries including India, the future has to lie in a committed SEP policy comprising precise FRAND guidelines, essentiality review procedures, and rate-setting mechanisms with ADR covering the entire structure of standards. These reforms are not in isolation of India's larger goals under initiatives such as Digital India and Make in India, reconciling local industrial growth with global IP alignment.

At the same time, it is necessary for such frameworks to encourage all forms of innovation including voluntary patent pools, cross sector licensing platforms and government assisted patent licensing collectives that will enable our indigenous innovators while reducing reliance on litigation focused models.

Global Jurisdiction and Remedies

The development of global rate-setting by national courts and the spread of anti-suit injunctions necessitate an international judicial cooperation protocol for SEP cases. A convention or model law likely to be coordinated through UNCITRAL or perhaps WTO—should be able to:

(i) Establish minimum criteria for testing injunction in SEP enforcement cases.
(ii) Define standards for recognition of foreign royalty determinations.
(iii) Promote neutral arbitral tribunals for international (transnational) disputes over SEPs.

Any such harmonization would curtail forum shopping, alleviate conflicting judgments, and bolster judging reciprocity.

Reimagine FRAND in the Light of Public Interest

Finally, we need to start thinking of FRAND obligations not simply as private contractual undertakings, but as quasi-public obligations in industries where SEPs are the foundation of vital services – health, education, communication and clean energy. Policy-makers and courts should factor in the public interest when deciding FRAND, so that licensing practices are consistent with broader development objectives and digital inclusion agendas.

This might include the imposition of lower or differentiated royalty rates in developing countries, ensuring non-exclusive access to essential infrastructure, or attaching public R&D subsidies to open FRAND licencing conditions.

The future of SEP enforcement and FRAND control depends on whether we will manage to shift from fragmentation to coherence, from untransparent negotiation to transparent platforms, and from litigation-driven enforcement to smart, interoperable and fair licensing. And as 5G and IoT revolution surges forward the law cannot be reacting, it must be evolving.

India has a strong judiciary, a burgeoning tech industry, and a strategic place in the world, and it can help lead the push for a new SEP order that is agency-driven, global North-South bridging, innovation and access bridging, competition and collaboration bridging. The time for interlinked, future-ready reform is not tomorrow but today!

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