SME Perspective—SEP Licensing In The IoT Market

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The Internet of Things (IoT) is an emerging market where interfacing and connectivity are the foundation for groundbreaking innovations, rapidly creating and expanding new economic opportunities. This fast-growing sector offers significant potential for small and medium-sized enterprises (SMEs), enabling them to leverage their agility and expertise to develop innovative technologies. By building on standardized communication layers and internet infrastructure, SMEs can introduce innovative solutions and create valuable new markets.

Communication interface, internet access, and other useful functionality like GPS rely on global standards, many of which incorporate patented technologies. SMEs often need to understand and possibly negotiate complex licensing agreements to use these technologies. However, many SMEs lack the resources to assess the patent landscape or manage licensing negotiations effectively. This article will explore these challenges, dispel common misconceptions, and offer both practical and policy guidance to help SMEs successfully navigate SEP licensing in the IoT market.

This article will be valuable to patent holders, potential licensees, policymakers, and judicial authorities seeking to understand the critical role of SMEs in the global economy and the challenges they face in SEP licensing.

I. Primer on Standards and Patents

Standards[1] Establish a widely accepted set of requirements for specific industries, ensuring interoperability and consistency across products and services. In communications, key standards include Wi-Fi standards, cellular network standards like 4G (LTE) and 5G, and personal area network standards such as Bluetooth, among others.

A patent is a statutory right granted by a government that gives the holder the exclusive right to prevent others from making, using, or selling the patented invention, subject to certain conditions. A patent holder may choose to license some or all of these rights to other parties in exchange for agreed-upon compensation.

Many standards incorporate patented technologies, known as standard-essential patents (SEPs), which are likely to be infringed when implementing the standard. The patent holder has full discretion over excluding others from using the technology, negotiating a license under agreed terms, or withholding enforcement unless necessary—such as for defensive purposes.

Since any SEP has the potential to obstruct the adoption of a standard, Standards-Setting Organizations (SSOs) seek assurances from patent holders—particularly those involved in developing the standard. These patent holders are expected to self-declare whether they own or control any SEPs and, if so, whether they intend to enforce them to block the standard or are willing to license them on Fair, Reasonable, and Non-Discriminatory (FRAND)[2] Terms or similar conditions. If certain SEPs are not available for licensing, SSOs may attempt to design around them.

The FRAND commitment is meant to accommodate various licensing scenarios. Patent holders may or may not engage in formal licensing negotiations, and they may or may not seek compensation.

For SMEs, infringement of SEPs can arise when implementing a standard or integrating a standards-based technology, component, or module into their products. A valid and infringed SEP cannot be avoided without breaking compliance with the standard. Products that fail to meet the standard risk losing critical functionality, such as the ability to interface with other devices or communicate over the internet.

II. IoT Environment and Patent Landscape

A. Patent Assertion Environment

Like any company developing products, SMEs may own patents, which they can retain for exclusive use or license to others, including for market expansion through voluntary commitments to standards. However, their design choices may also infringe on third-party patents, including SEPs. Investors usually look to evaluate the protective and asset value of a company's patent

1. In this article, the term "Standards" refers to those developed by standard-setting organizations, including international bodies like ISO, IEC, and ITU; regional groups such as ETSI, CEN, and CENELEC; incorporated entities like IEEE, DVB, and ANSI standards-developing organization members; and industry groups like the USB-IF and the USB Developers Forum.

2. In this article, the terms *"Fair, Reasonable, and Nondiscriminatory (FRAND)"* and *"Reasonable and Nondiscriminatory (RAND)"* are used interchangeably and share the same meaning.

portfolio and potential liabilities, making IP strategy an important consideration for SMEs.

B. Patent Exposure for SMEs Can Arise in Two Ways:

1. **Design-Based Infringement**—This occurs when a product's design or engineering choices inadvertently infringe on existing patents. In many cases, a redesign can mitigate infringement risk.
2. **Standard-Based Infringement (SEP Infringement)**—Some patents are essential to implementing a standard, meaning compliance with the standard requires using those patents. Unlike design-based infringement, SEPs generally cannot be avoided without abandoning compliance with the standard.

C. Primary IoT Interface

SME IoT devices may connect to the internet through various methods. Home monitoring devices typically connect to home routers or each other via Wi-Fi or Zigbee interfaces. Mobile devices, such as heart monitors, blood sugar monitors, and trackers, may include Wi-Fi, cellular, or other communication circuits. Alternatively, they can use Bluetooth to connect to a user's cellphone, which stores data locally and transmits it to the internet as needed using cellular technology. Smart City devices, such as power meters, often rely on internal circuitry or plug-in modules to establish connections to a server using Wi-Fi, cellular networks, LoRaWAN, or other technologies.

Implementing a communication standard requires considering injunction risks and royalty exposure. For example, an SME heart monitor can use a low- or no-royalty interface like Bluetooth to transmit data to a patient's cellphone. In this example, any potential Wi-Fi or cellular patent exposure falls on the phone rather than the monitoring device. However, if constant cellular communication without the presence of a cell phone is required, the device manufacturer may choose to integrate cellular connectivity circuitry directly into the device.

IoT SMEs can use their patents to protect proprietary technologies or license them to expand market opportunities. They face patent risks due to their design choices and reliance on standardized technologies. Interface standards, particularly those involving internet connectivity, have patent implications that require careful assessment to minimize potential risks.

Given the diverse ways IoT devices connect to the internet, SMEs must assess not only their technical choices but also the associated patent risks. These decisions influence their exposure to licensing demands, injunction risks, and royalty obligations. With this in mind, SMEs should carefully consider their approach to patent strategy—whether focusing on defensive licensing, monetization, or a hybrid model (see below).

D. Understanding Defensive and Monetization Strategies

A well-known phrase in the standards community states: "Cooperate on standards, compete on product." This principle suggests that companies looking to expand their product markets should leverage their patents to promote industry-wide adoption, while competing fiercely on proprietary innovations that set their products apart.

For example, a memory stick manufacturer may contribute to the USB standard without seeking royalties, expecting that a widely adopted USB interface will increase demand for USB-compatible devices like laptops, cameras, and phones. The company may informally license its SEPs on FRAND terms. Often, no formal licensing is needed. This approach of only asserting patents when threatened by a practicing entity is known as "mutually assured destruction." It helps prevent disputes by maintaining a balanced respect for patent rights. However, the memory stick manufacturer will still vigorously protect its proprietary technologies, such as advanced storage and retrieval systems, which improve performance and justify a premium price for its branded thumb drives.

By contrast, companies whose primary business revolves around standardized technology and who rely on patent licensing as a revenue source will seek to monetize their SEPs through royalties. For example, IBM, with one of the largest patent portfolios, actively licenses its intellectual property to generate revenue. Ideally, in theory, such companies are fairly compensated for the intrinsic value of their patented technology as it applies to licensed products. Their revenue increases with the broad adoption of the standard, ensuring a larger market for their licensing activities.

E. What Makes SME Strategies Different?

SMEs seeking to maintain exclusive control over their proprietary technology through patents may assert their patents as needed. However, as noted earlier, licensing can be more challenging for SMEs due to their limited experience and resources.

1. Licensing Out SEPs:

SMEs seeking to license their SEP technology for revenue must assess their position relative to numerous other claimed SEPs and anticipate skepticism from potential licensees. Expert legal counsel is essential. Establishing a licensing program incurs costs for negotiations, contract management, and royalty collection. Joining a patent pool can help manage these expenses by pooling resources and streamlining the process.

In many cases, adopting a defensive strategy—such as choosing a FRAND or RF-RAND approach—can be

the most effective path for market growth.

2. Licensing In SEPs:

Unlike large corporations with dedicated legal teams and licensing experts, SMEs often lack the resources to challenge unfair SEP demands. This makes them easy targets for licensors looking to extract supra-FRAND[3] Rates or set unfavorable precedents for future negotiations with the SME and others.

An SME entering SEP licensing negotiations must carefully consider timing and strategy. SEP holders primarily focused on defensive strategies may overlook potential infringement. For monetizing SEP holders, early SME revenue and market presence may be too small to attract attention, yet the SME remains exposed. SMEs should be particularly cautious of purported SEP license comparables negotiated under the threat of an exclusionary injunction, which often pushes inflated rates.

As the company grows and reaches critical mass, SEP holders—especially those focused on maximizing royalties—are more likely to take notice. When faced with a demand letter seeking a license, the SME should conduct a thorough review of the relevant SSO's IPR policies, seek expert legal and technical counsel, exercise caution when assessing disclosures of supposed comparables, demand transparency in FRAND determinations and past licensing agreements, and check out the company's patents, history of assertion, connection to SEPs, etc.

In some cases, obtaining a license from a SEP patent pool may help secure a fairer rate, but caution is still necessary. For instance, in the 2024 case *Tesla Inc. v. Idac Holdings, Inc.*,[4] representatives of the Avanci patent pool and its founding members—who contributed technology to ETSI standards—argued that Avanci was not bound by their FRAND obligations to ETSI. This underscores that patent pool rates do not necessarily reflect FRAND licensing terms, and potential licensees must exercise diligence.

While many SEP license negotiations conclude without issue, some negotiations can become excessively aggressive, with attempts to extract supra-FRAND terms. For example, in the 2023 UK High Court of Justice case *InterDigital v. Lenovo*,[5] InterDigital testified that it granted volume discounts to large licensees—most notably, an 80 percent discount to Samsung over its standard negotiated rate, including rates applied to SMEs. Such disparities can significantly disadvantage SMEs, raising concerns about discriminatory licensing practices. Other discount structures may exist that better align with FRAND principles. The key lesson for SMEs is to thoroughly understand all potential discount programs and challenge those inconsistent with FRAND.

SMEs must approach SEP licensing negotiations strategically to avoid drawing unnecessary attention from SEP holders. In the early stages, even monetizing SEP holders may overlook smaller SMEs entering the market. However, as their products gain traction, SMEs remain vulnerable to unfair licensing terms due to limited resources. They should be especially cautious of inflated rates resulting from agreements negotiated under the threat of exclusionary injunctions.

In conclusion, strategy and timing are critical to mitigating risk and securing fair terms. While early-stage SMEs may avoid immediate scrutiny from SEP holders, they remain vulnerable to unfair agreements, especially when licensors seek to establish unfavorable precedents. As the business grows, proactive due diligence becomes essential—carefully scrutinizing SEP holder claims, understanding FRAND principles, and demanding transparency in licensing negotiations. Patent pools may offer a potential avenue for licensing, but their terms should not be assumed FRAND-compliant without careful examination. Disparities in negotiated rates, as seen in cases like *InterDigital v. Lenovo*, highlight the need for SMEs to challenge discriminatory licensing practices and push for equitable treatment. By staying informed and strategic, SMEs can better navigate SEP licensing while minimizing exposure to excessive demands.

F. Misconceptions and Challenges

In 2022, Joachim Henkle conducted a fascinating study titled *"Licensing Standard-Essential Patents in the IoT—A Value Chain Perspective on the Markets for Technology."* He canvased about 30 firms (including SMEs and startups), noting several points of confusion, misunderstanding, and outright challenges. The remainder of this article addresses the misconceptions and challenges outlined in his findings.

1. Misconceptions About Where Licensing Takes Place

Unless restricted by local laws, regulations, or contracts, patent holders—including SEP owners—can enforce their patents at any level of the supply chain, from components to end products. In the U.S., patent holders (in theory) are entitled to compensation only for their actual invention. However, downstream licensing can complicate value determinations.

Ideally, licensing should occur where infringement occurs—at the component level where the standard (for example, Wi-Fi) is implemented—since this is where the SEP's value is most directly realized. However, as

3. Supra-FRAND refers to any rate or term that exceeds FRAND, as determined by a competent authority. Such rates or terms violate the SEP holder's binding FRAND commitment.

4. *Tesla Inc. v. Idac Holdings, Inc.*, Claim No. HP-2023-0042 [2024] EWHC Pat (oral arg., May 20-22, 2024).

5. *Interdigital v. Lenovo*, [2023] EWHC 539 (Pat).

components are integrated with other technologies and enhanced by innovations from upstream suppliers and the SME itself, the SME product gains significant additional value. Ignoring these upstream contributions when determining royalties for downstream products distorts SEP valuation and inflates the royalty base beyond what is justified.

This issue becomes even more problematic when an SME supplies components to an end-product manufacturer, but licensing occurs at the end-product level. In such cases, proper proportional consideration must account for the contributions of all upstream vendors—including the SME—as well as the innovations of the end-product maker. However, when the license is negotiated solely between the end-product manufacturer and the patent holder, the SME has no visibility or control over the patent liability associated with its product. This can have severe financial consequences, as the end-product manufacturer—lacking full knowledge of the upstream technologies and contributions—may negotiate terms that fail to allocate costs fairly. Ultimately, the end-product manufacturer is likely to pass down licensing expenses to suppliers, making it impossible for upstream vendors to calculate margins or plan effectively and accurately.

Some patent holders use this distortion to exploit end-product licensing by inflating the perceived value of their contribution. These and other "hold-up" strategies can lead to excessive royalties, undermining fairness, stifling innovation, and burdening manufacturers and contributors throughout the supply chain. For more details, see my LinkedIn article: *How Hold-up Damages Economic Growth*.

In conclusion, licensing should ideally occur at the point of infringement. When licensing takes place further downstream, it is crucial to carefully separate the value of the SEPs from the value added by other innovations and contributions to ensure a fair and accurate royalty assessment.

2. Misconceptions About Selling Unlicensed Products

In the Information and Communications Technology (ICT) sector, suppliers of essential standardized components often cannot sell fully licensed products. This is because several major ICT SEP holders choose to license only at the end-product level. For example, in the automotive industry, some SEP holders license only OEMs like Daimler, Ford, and Toyota while refusing to license suppliers such as Bosch, Denso, and Continental. The Avanci patent pool follows a similar approach, licensing only OEMs, which adds further complexity for suppliers.

Navigating the patent landscape for technical standards is also highly complex. Many patents are self-declared as standard-essential but are not, leading to "over-disclosure" in cellular communication standards. For example, as of this writing, the *ETSI Patent Database* lists over 107,000 self-declared patent families. And studies by the European Commission estimate that 20 to 40 percent are not essential. Additionally, many of the claimed SEPs will not survive a validity challenge.[6] Any party not deeply familiar with the technology, and even those who are familiar, will have difficulty understanding what and how many patents may apply.

Further complicating the SEP landscape, some valid SEPs are owned by entities that did not participate in the standards-development process and have made no voluntary licensing commitments, leaving them unbound by FRAND obligations.

Given the above challenges, it is often unrealistic for upstream suppliers to provide indemnification against SEP claims. While some have secured limited licenses, indemnity remains uncommon in the cellular communications sector. As a result, downstream companies—such as end-product manufacturers—are often the ones negotiating licenses when approached by SEP holders.

3. Legal and Technical Challenges

Beyond the legal and technical complexities of SEP licensing negotiations, SMEs often face significant challenges in understanding how standardized patented technology gets implemented. Since they do not design or develop the underlying SEP technology themselves—relying instead on pre-built logic modules or discrete circuits—they often lack a critical understanding of the SEP technology and licensing environment. This lack of technical information, combined with limited access to critical licensing information, makes it difficult for SMEs to evaluate infringement claims properly. As a result, when confronted with licensing demands, they require expert legal counsel and specialized technical support to assess the legitimacy of asserted SEPs and negotiate fair terms.

Some licensors exploit this knowledge gap by targeting licensing at the end-product manufacturer level, where SMEs have the least bargaining power. This strategy makes litigation prohibitively costly and burdensome, pressuring SMEs to accept inflated supra-FRAND rates—not just to avoid exclusionary risks but also to escape overwhelming legal expenses. For guidance on navigating SEP licensing challenges, see Section II.E.2 above.

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6. See "Specialist chapter: How to identify and prevent patent injunction abuse in high-stakes litigation," *IAM Patent Litigation Review*, Earl Nied (January 2025), *https://www.iam-media.com/review/the-patent-litigation-review/2025/article/specialist-chapter-how-identify-and-prevent-patent-injunction-abuse-in-high-stakes-litigation.*

4. Litigation, Mediation, Arbitration Conundrum

Most licensing negotiations conclude without dispute, but when conflicts arise, there are alternatives to litigation. Litigation, while often a last resort, has the advantage of being a formal legal process with fixed rules and procedures. Depending on the jurisdiction, courts have the authority to collect and review evidence, and the appeal process is well-defined.

Alternatively, parties may opt for non-binding mediation, where a neutral mediator, agreed upon by both sides, facilitates negotiations. This flexible process can help resolve disputes and potentially lead to a licensing agreement before litigation or arbitration becomes necessary.

Binding arbitration is another option, typically requiring mutual agreement between the parties. It may involve a multi-person panel acting as decision-makers, but unlike a court, arbitration lacks broad authority to collect evidence and enforce rulings. While arbitration can be faster than litigation, it is a complex process that requires careful consideration. The time and resources invested in arbitration can be substantial, so all parties must fully understand the process before committing.

5. Early Mover Disadvantage

It may seem counterintuitive, but rushing to negotiate a license can have drawbacks. The key concern is that your competitors may not be as quick to agree, leaving the SME as the only one paying royalties while others stall or refuse to pay. This disparity puts every paying licensee, especially SMEs, at a competitive disadvantage.

One potential solution is to license patents at the level where infringement is most likely to occur. This approach would minimize the number of licensees involved and promote fairer treatment. Patent holders, regulators, and legislators should explore ways to encourage this form of origin-based licensing.

Another proposed solution allows potential licensees to pool their negotiation resources into a Licensing Negotiation Group (LNG). LNGs could help SMEs gain collective bargaining power, similar to patent pools on the licensor side. While this concept raises certain competition concerns, it is gaining traction, and antitrust authorities are evaluating how it could be implemented in a fair and compliant manner.

III. Conclusion

The IoT presents immense opportunities for SMEs to innovate, expand, and compete in global markets. However, the reliance on standardized technologies introduces significant challenges, particularly in navigating SEP licensing. Without a strategic approach, SMEs risk facing excessive royalty demands, litigation threats, and licensing imbalances that could stifle their growth.

To effectively navigate SEP licensing, SMEs must think strategically by preparing for negotiations when necessary but not assuming that every SEP assertion translates into a legitimate royalty obligation. Careful assessment of technical and legal risks, distinguishing between valid and over-declared SEPs, and leveraging expert counsel are crucial to avoiding unnecessary costs and securing fair terms. By demanding transparency in FRAND determinations and challenging discriminatory licensing practices, SMEs can push for more balanced agreements.

Beyond individual negotiation strategies, systemic reforms are also necessary. Policymakers, regulators, and industry leaders should work toward greater transparency in SEP declarations, more rigorous essentiality assessments, and licensing frameworks that ensure fair competition. Encouraging origin-based licensing at the component level and exploring collaborative negotiation mechanisms can help address power imbalances and prevent SMEs from being unfairly burdened.

Ultimately, SMEs must remain informed, proactive, and strategic in SEP licensing negotiations. By advocating for equitable licensing frameworks, leveraging available negotiation strategies, and engaging with industry and regulatory bodies, SMEs can unlock the full potential of the IoT market—without being held back by unfair licensing obstacles. ■