

Assessing the potential impact of differences in regional scope when valuing SEP licences

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Courts and arbitrators are often faced with the question whether FRAND royalties for standard-essential patents (SEPs) should vary across regions. In principle, they might. But in practice, the force of the evidence commonly advanced is brittle.

In this article, **Pekka Sääskilahti, Lotta Väänänen, Andrew Tuffin, Timo Autio, and Erkkä Heikkinen** examine the most frequent methods proposed for calibrating regional adjustments: differences in regional product prices, and differences in regional SEP portfolio strength. Neither provides a compelling basis for regional adjustments. Price differences mainly reflect the variation in products sold, not the amounts that consumers pay for equivalent products. Further, adjustments based on regional patent strength would increase the transaction costs of licensing, something that willing parties would seek to avoid.

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1 Introduction

Global technology standards sit uneasily on territorial patent rights. Standard Essential Patents, like all patents, are granted country by country, yet technology standards are created cooperatively and intended to be implemented globally. Courts have accepted this is a commercial reality for parties negotiating licences covering Standard Essential Patents. For global companies, negotiating and enforcing rights jurisdiction by jurisdiction would be “madness” – costly, slow, and often futile.² Willing parties with global operations would agree a licence with global scope.

However, it creates a practical challenge. When parties negotiate terms for a global licence,³ would the reasonable royalty terms vary depending on the regional scope of licensed sales or licensed rights? The prevailing answer, in courts and arbitrations, is that they might. In public judgments⁴ that consider the issue, the labels have varied, but the broad approach is the same: there may be “Major Markets”, where a particular royalty rate is reasonable; and “Other Markets”, where a lower rate is reasonable – determined by applying a regional “discount” to the rate in Major Markets.⁵ The royalty for the global licence is therefore a weighted average, reflecting its specific mix of geographical markets.

This article considers whether the reasonable value of an SEP licence should vary by region and, if so, how that effect should be measured. The underlying rationale may appear plausible. However, in practice, the claim often lacks evidential support and the methodologies used to calibrate the discounts are flawed. So, even where accounting for regional variation may improve a valuation in principle, typically, it makes it worse.

2 Analysing differences in regional scope: in principle, and in practice

The reasonable royalty for the licence reflects the value of the technology for which it provides consent to use.⁶ Should that reasonable royalty depend on where the licensed products are manufactured and sold? In principle, possibly. But even then, the scale of that impact needs to be identified in practice. In this section, we look at: the rationale for regional variation; an emerging framework in case law for analysing it in practice; and a practical test for assessing regional adjustments when comparing SEP licences.

2.1 Regional variation in principle: a proxy, not a cause

Two factors are typically claimed to motivate regional variation in royalties.

- **Value and economic circumstances: variation in consumer demand for the technology itself.** In principle, the value users place on the functionality enabled by a patented technology may vary by region. That may reflect differences in preferences, income, infrastructure, or usage patterns. If the licensed technology increases consumers' willingness to pay for implementing products more in one region than another, the royalty for that technology may reasonably differ. A profit-maximising firm would seek to price regions differently based on the differences in willingness to pay, conditional on there being no resales between regions.
- **Patent coverage: variation in the licensor's ability to monetise the value of its technology.** That ability varies with two factors: (a) where the SEP holder owns patents, and (b) where the implementer's products are sold or manufactured. The claim is that, even where the technology adds value, the products manufactured or sold in some regions may be royalty free, if the licensor lacks patents there. Even where a licensor has patents, they are not self-executing. Their commercial force depends on the extent of infringement in a region, and on the relevant courts', and competition authorities' attitudes toward that infringement, patents in general, and for SEPs, the FRAND commitments required by standards organisations. Those attitudes can vary across jurisdictions and over time, which may affect the patent owner's ability to monetise its intellectual property.

Each factor can, therefore, affect the royalty that parties would agree. However, neither applies automatically nor with equal effect. Whether these factors affect negotiations, and to what extent they affect them, are factual questions that should be tested in the evidence.

2.2 Regional variation in practice: an emerging framework for analysing regional scope

The extent to which an SEP licence's regional scope affects its FRAND rate has been an issue in FRAND determinations based on comparable licences. The issues are not limited to this context, but it provides a useful and practical way to explore them.

Comparable contracts can offer a guide on the rates that parties consider reasonable. Essentially, it is a benchmarking exercise. The basic premise is that, absent hold-up and hold-out (or its more neutral term, "non-FRAND" factors⁷), similar parties will agree similar rates for similar licences. However, exact parallels are rare for SEP licences. Contracts will differ in various ways that may affect the rates that parties agree to. In principle, the closer the parallel, the better the guide. But typically, even the closest comparables have differences that affect the value of the licence. Where possible, therefore, adjusting for the impact relevant differences have on royalty rates can improve the valuation.

Differences in regional scope is one of the potentially relevant differences. Over recent years, a broad framework has emerged for analysing the issue, based on four judgments: *TCL v Ericsson*

(USA), *Unwired Planet v Huawei (UK)*, *Interdigital v Lenovo (UK)*, and *Nokia v Oppo (China)*.⁸ Their details differ, but the core elements are alike. The framework and specific approaches have then influenced the approaches put forward in subsequent negotiation, litigation, and arbitrations.

The judgments share three common elements that are worth generalising (**Table 1**):

- The rationale provided;
- The relevant regions identified; and
- The methodology used for calculating discount rates.

Table 1: Overview of rationale, regions, and evidence base in influential judgments

Judgment	Rationale for regional variation	Relevant regions	Evidence base for adjustment
TCL v Ericsson	Patent coverage: Yes Technology's value and economic conditions: No	Three regions: Benchmark region: USA Discounted regions: Europe; and Other	Patent data: Regional patent strength ratio, relative to USA.
Unwired Planet v Huawei	Patent coverage: Yes Technology's value and economic conditions: Yes	Two regions Benchmark region: Major Markets Discounted region: Other Markets	Comparable licences: evidence of lower regional rates Regional patent data: ratio for scaling small portfolios
InterDigital v Lenovo	Patent coverage: Yes Technology's value and economic conditions: Yes	Two regions Benchmark region: Developed Markets Discounted region: Emerging Markets	Product sales data: Average Selling Price ratio, relative to Developed Markets
Nokia v Oppo	Patent coverage: Yes Technology's value and economic conditions: Yes	Three regions: Benchmark region: Countries with at least 20,000 USD GDP per capita Discounted regions: Mainland China; and Other Countries.	Patent data: Regional patent strength ratio, relative to USA and Europe.

Source: Authors' review of (i) *TCL v Ericsson* [2017] No. 8:14-cv-00341, (C.D. Cal.); (ii) *Unwired Planet v Huawei* [2017] EWHC 711 (Pat); (iii) *InterDigital v Lenovo* [2023] EWHC 539 (Pat); and (iv) *Nokia v Oppo* [2023] from a translation of The People's Republic of China Chongqing First Intermediate Court (2021 Yu 01 Minchu no. 1232).

Element 1: Specifying the rationale for variation in the particular set of circumstances.

Each judgment accepts that, in principle, rates may differ across regions due to differences in the value of the technology itself, or patent coverage and enforcement. However, that is not a general truth. In a given case, both the fact of regional discounts and the rationale for them should be specified, investigated, and grounded in the relevant evidence.

Whether in fact regional variation has had any impact on the rates that parties have agreed to in practice, and particularly the *extent* to which it has had any impact, is a factual matter and may depend on the parties' particular circumstances.

It also matters *why* regional variation has or has not affected the rates parties agreed to. If parties merely follow common commercial practice, the Court may still need to establish whether that commercial practice is *reasonable*, or it demonstrates a party's acquiescence to a common non-FRAND factor that willing parties would not adopt.⁹

The validity of an approach depends on the specific set of circumstances. A rationale that applies in one scenario might not apply in others. For instance, in *InterDigital v Lenovo*, the Court explained that the approach taken in *Unwired Planet v Huawei* to assess differences in regional patent coverage applied well to licensors with very few SEPs, such as Unwired Planet, but not to licensors with a large portfolio, such as InterDigital. We explore the reasons for that below (see Section 4.1).

Element 2: Specifying the relevant regions.

If it is considered that regional scope is relevant, then the next question is how to divide the world for the purpose of the analysis. Two considerations matter.

The first is granularity: how many regions should there be?

For purposes of the court's valuation, the prominent court judgments divided global licences into only two or three regions: (a) one region where the "benchmark" FRAND rate would apply, and (b) one or two other regions, where another lower rate would apply. In theory, a more granular approach could be taken. Regional variation could be assessed continent by continent, country by country, or at an even more granular level – for instance, if regional variation is relevant within large and economically diverse sovereign states such as the U.S., or India, or China.

In practice, courts have acknowledged that the benefits of a more granular approach would quickly be outweighed by its costs. Common sense supports this. Practical and willing parties would limit the granularity of region analysis to relatively few groups that have material differences between them to economise on transaction, monitoring, and reporting costs related to geographic variations.¹⁰

The second consideration is how to allocate each regional market to a specific group.

In principle, that approach should align with the stated rationale for the adjustment. If a party claims that regional variation in patent coverage affects the rate, then the regions allocated to "Major Markets" should reflect that. If, however, the claim relates to differences in consumer demand, then the approach to allocation should reflect that.

However, here too, there may be a degree of reasonable pragmatism. The relationship between patent coverage and regions where technology adds most value is not independent. Filing and maintaining patents is expensive. If a technology creates substantial value in a market, a licensor has a stronger reason to seek protection there. If the value is limited, filing may not be worth the cost. The relationship is imperfect and may lag, but substantial overlap is unsurprising. So, in practice, a country such as the USA is likely to be a Major Market from both a patent coverage and consumer demand perspective, and Belize is unlikely to be.

Aggregation in broad categories is pragmatic, but it is not without risk and complications.

Groups should capture broadly similar regions and differentiate between dissimilar ones. But categories that seem intuitive to apply in principle can be difficult to impose satisfactorily in practice. For instance, Brazil is often grouped with Emerging Markets, even when its product prices exceed

those in countries typically grouped in Developed Markets. The facts underpinning these considerations also change over time. Brazil is now an important and effective jurisdiction for SEP enforcement. China, once considered an emerging market in commercial and enforcement terms, is (at least) more ambiguous now.¹¹

Element 3: Methodologies to estimate the scale of the adjustment to be applied.

This is where the approach to analysing regional variation often breaks down.

Each of the influential judgments applied substantial regional adjustments that resulted in “discounts” for implementing products sold (or manufactured) in some regions.

The evidence bases that have been used to calibrate or justify specific adjustment factors vary. Broadly, three sources have been relied upon:

- **Commercial practice.** In *Unwired Planet v Huawei*, a factor of 50% was applied to determine the rate to be applied in China. That was based on the practice observed in comparable licences, in which the rates agreed for China were often lower than for the rest of the world, although the specific factor varied.¹² That factor was also applied to “Other Markets” on the basis that all licensed products would be produced in China, so it provided a “manufacturing floor”. The adjustment factor was intended to capture the impact on rates of differences in regional economic circumstances, not patent coverage (which was addressed with a separate scaling factor).¹³
- **Data on average selling prices for products.** In *InterDigital v Lenovo*, evidence on the variation in regional product prices was presented as demonstrating the difference in regional economic circumstances. This was interpreted as “relevant data” that substantiated the commercial practice observed in comparable licences, and could “refine” subsequent negotiations.¹⁴ This evidence base was subsequently presented and considered in *Samsung v ZTE*.¹⁵
- **Data on regional patent coverage.** *TCL v Ericsson* took a royalty rate it calculated for the USA as a baseline and applied a regional patent strength ratio to each generation of SEPs. When looking at 2G SEPs, for example, it applied a 27.8% adjustment to the rate for Europe and a 45.1% adjustment for the Rest of the World.¹⁶ *Nokia v Oppo* took a similar approach, applying a 38.58% discount to the rate charged in Developed Nations based on differences in regional patent portfolios.¹⁷ To avoid double counting, no adjustment for patent coverage was made in *InterDigital v Lenovo*.¹⁸

All three sources are problematic. Commercial practice alone can be relatively weak evidence. It may merely reflect the influence that non-FRAND factors can have on negotiations. It benefits from compelling empirical or theoretical support. However, neither the data on regional product prices nor patent portfolios support regional discounts. Both are flawed, failing to demonstrate that regional discounts are reasonable factors that willing parties would take into account.

Here, we summarise why, before exploring the issues in detail in the sections below.

The regional difference in average selling prices is irrelevant and misleading: products differ regionally.

In Section 3, we show that the regional differences in average product prices say nothing coherent about regional variation in the value of the patented technology itself. Rather, they show something simpler that, on this evidence, suggests no discount should have been applied at all:

- Prices differ regionally largely because consumers in different regions buy different phones, with different brands and features that affect their prices. Cellular technology is only one feature among many that affects the phone prices consumers are willing to pay in each region.
- Prices for identical phones with identical features are broadly similar in each region: products with premium features broadly have premium prices wherever they are sold; products with basic features broadly have low prices wherever they are sold.

The fact that a greater proportion of American consumers buy phones with premium features than Indian consumers means the simplistic *average* price of phones is higher in the USA. But that does not mean Indian consumers pay half as much for an identical phone or a specific feature.

One can argue that royalties for cellular technology should be higher when implemented in phones with premium features than they should be when implemented in phones with basic features. But, if so, that case must be argued directly, not smuggled in through a regional discount.

Regional differences in regional patent strength create perverse long-term incentives

In Section 4, we show that the simple difference in regional patent portfolios is also a bad proxy.

Willing parties would not use this as a metric to calculate regional discounts. If they did, it would simply drive up costs for licensors in the long term, which would be passed on to licensees and consumers for no additional gain.

Before exploring these points in detail, it is useful to show how the regional discount framework operates in a simple comparable-contracts exercise.

2.3 [A practical test for regional adjustments when comparing contracts: does the adjustment make the comparable contracts a better guide, or worse?](#)

Consider this simplified example of a comparables analysis.

Two parties negotiate a global licence for cellular SEPs for use in smartphones (“Focal Contract”). **Table 2** compares this Focal Contract with other contracts. For the sake of illustration, assume that: (a) there are Major Markets, where a particular rate is charged, and Other Markets, where a “discounted” rate is charged; (b) that the regional discount is, in this hypothetical example, genuinely 50%; and (c) that there are no other differences between these contracts that affect their value.

Table 2: Stylised comparable contracts before and after a regional discount adjustment

Contract	Major Market Share	Other Market share	Unadjusted rate agreed in contract	Adjusted rate to reflect the Focal Contract’s regional scope
Comparable A	100%	0%	\$4.00 / unit	\$3.50 / unit
Comparable B	50%	50%	\$3.00 / unit	\$3.50 / unit
Comparable C	0%	100%	\$2.00 / unit	\$3.50 / unit
Comparable D	80%	20%	\$3.60 / unit	\$3.50 / unit
Focal Contract	75%	25%		\$3.50 / unit

Source: Authors’ analysis.

Following these assumptions, two important dynamics are worth noting.

- **First, the initial unadjusted royalty rates differ only *because* their regional scope differs.** They are broadly comparable contracts, but not exact parallels. On a like-for-like basis, the contracts have agreed the same underlying prices: \$4 per unit for all products sold in Major Markets and \$2 per unit for all products sold in Other Markets.
- **Second, in this idealised example where we can adjust perfectly and reliably for this difference, the adjustments converge on the same FRAND rate.** For all contracts, we can estimate the adjusted rate that parties would have agreed in the Focal Contract's circumstances. In this case, the adjusted rates converge to \$3.50 per unit: a 75/25 blended rate of the Major Markets rate, and the discounted Other Markets rate. That they converge, demonstrates that the assumptions were valid, and we find that the adjusted rates provide the true reasonable rate for the Focal Contract.

In reality, adjusted rates rarely converge in this precise manner. In practice, we have seen some parties present regional adjustments that *widen*, rather than narrow, the gap between otherwise comparable contracts. That may be justified, but it is a warning sign that further investigation and explanation is required. When adjustments fail to narrow the range of rates, it can indicate that the adjustment itself is flawed, either in principle, or in how it has been applied in practice.

There are two general lessons here, that should be applied when working with comparable contracts.

- **The closest comparable is the better starting point.** The appeal of the comparable approach is that it provides evidence on what the market considers reasonable, not what an analyst estimates is reasonable. Where adjustments are reliable, they can improve a valuation. But adjustments introduce a risk of error and dilute the initial appeal of the approach: relying on observable market evidence. As a general rule, that risk is less severe for a contract less in need of adjustment.¹⁹
- **Even if an adjustment is necessary in principle, it will not improve a valuation unless it is reliable in practice.** The methodology used to adjust rates must be grounded in the economic and commercial rationale for the adjustment, and the facts of the case. If it is not, there is no reason to believe it helps improve the valuation, and may make it worse.²⁰

In our experience, the methodologies that are typically used when applying regional adjustments fail the second of these general lessons. Even where they are right in principle, they are often too unreliable in practice.

3 Analysing whether the value of the licensor's technology itself varies regionally

In principle, consumer demand for a particular technology may vary between regions. Typically, the variation in average *product* prices between regions is assumed to show or approximate the scale of that variation in demand for the patented technology. It doesn't. The same product with the same features sells for roughly the same price wherever it is sold. The implication being that the same technology used in the same way would have the same royalty *wherever* it is used.

In Section 3.1 we show average prices in each country vary simply because the features that products typically offer in each country vary regionally, which affects the product prices.

In Section 3.2, we look at whether consumer demand for a specific feature, in this case cellular technology, varies regionally.

3.1 Why the regional variation in average product prices is an irrelevant and unreliable proxy

Product prices differ markedly across regions. **Table 3**, for example, shows the average selling prices of 5G smartphones in the USA, China, India, and Brazil. On average, prices in India are 60% lower than they are in the USA.

That variation is often used by parties advocating for a geographic adjustment to royalty rates for two purposes: first, as evidence that the value of the technology itself varies by region; and second, as a way to calibrate the discount applied to royalties.

It does neither task well.

Table 3: Regional average selling prices (USD) for 5G smartphones: USA, China, India, Brazil (April 2019 to September 2024)

	USA	China	India	Indonesia	Brazil	'Global' weighted average
Average selling price	906	483	361	501	520	566
Variation from USA	0	-423	-545	-405	-386	-340
Variation from USA (%)	0%	-47%	-60%	-45%	-43%	-38%

Source: Authors' analysis based on data from IDC.

Prices differ regionally because products' features differ regionally

Variation in product prices does not provide evidence that American consumers are willing to pay twice as much as Indian consumers for the same product, let alone a particular technological feature in that product. Rather, it shows they buy different products.

The phones sold in the USA are more expensive than the phones sold in India because their features differ, and those features command higher prices. We can see this in **Table 4**, which shows the same price data as before, but this time reveals the prevalence of other features. Among other differences, more of the phones sold in the USA have large high-resolution screens, more storage, a faster processor, and an iOS operating system.

Table 4: Regional Average Selling Prices and selected features for 5G smartphones: USA and India (2019Q2 – 2024Q3)

	USA	India	Difference #	Difference %
Average selling price (USD)	906.0	361.0	-545.0	-60.1
Screen size (inches)	6.4	6.6	0.2	2.5
Screen resolution (ppi)	49.1	42.4	-6.7	-13.6
Memory (GB)	6.5	7.2	0.7	10.8
Storage (GB)	261.7	174.5	-87.2	-33.3
Processor power (GHz)	2.9	2.6	-0.3	-9.0
Operating system: (iOS% vs Android)	57.9%	11.6%	46.3	80.0

Source: Authors' analysis based on data from IDC.

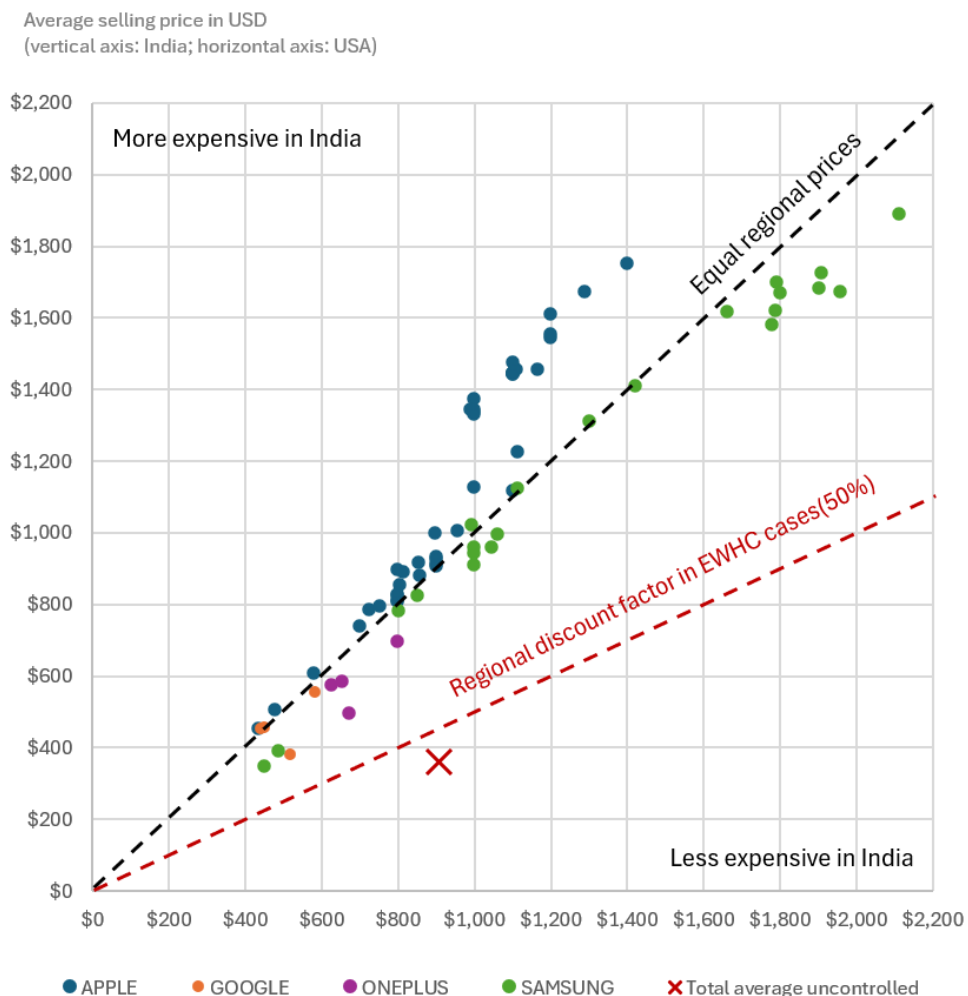
In this analysis, we have already excluded 4G phones. However, if the analysis had looked at the ASPs of all phones sold in each region, then it would have shown that, in this period, more of the phones sold in the US implemented 5G (56.0%) than they did in India (29.5%). That contributes to a higher average price in the US than in India, as the functionality of 5G phones is greater. It would not, however, justify reducing the 5G royalties on 5G phones sold in India.

Products with similar features sell for similar prices, *wherever they are sold.*

Instead of looking at average prices that ignore differences in phones' product features, what happens if we compare the prices of phones with exactly the same features?

Intuitively, a particular phone will sell for a similar price wherever it is sold. To illustrate: the iPhone 16 sold for \$799 in the USA and \$808 in India, not \$400; the Samsung Galaxy S22 sold for \$799 in the USA and \$782 in India, not \$400. To show the full picture, **Figure 1** plots the average prices of *all* phones that sold at least 50,000 units in their first 12 months on sale in both the USA and India. The vertical axis shows the price in India; the horizontal axis shows the price in the USA.

Figure 1: Comparison of phone prices in India and USA



Source: Authors' analysis based on data from IDC data between April 2019 and September 2024 inclusive.

Notes: The chart shows the average selling price in India and the USA for a particular model of phone in the first 12 months after its launch for all models that sell at least 50,000 units in each region during that period.

Any phone that sold for exactly the same price in the USA and India will sit on the black “equal regional prices” line. Below that line, phones are cheaper in India. Above it, phones are more expensive in India. The red “regional discount factor in EWHC cases (50%)” line shows the problem with the rationale underpinning the regional adjustments applied in *Unwired Planet v Huawei*, *InterDigital v Lenovo*, and *Samsung v ZTE*. It shows where phone prices would be if, *on a like-for-like basis*, prices in India were genuinely 50% less than they are in the USA. None come close.

Most phones sit relatively near the equal regional prices line. There is variation, particularly in the most expensive segment of the market. iPhones that sold for \$1000 or more in the USA are substantially more expensive in India. That regional surcharge mostly relates to iPhone Pros. Samsung phones that are priced above \$1600 in the USA are cheaper in India; these mainly relate to Samsung Folds. Phones sold for \$700 up to \$1000 in the USA tend to have similar prices in India. More basic models tend to be cheaper in India, and some are substantially cheaper. None, however, are close to the 50% discount line. Nor are they anywhere near the simple comparison of average prices when *not* controlling for other product features.

The striking aspect of this analysis is not only the clear pattern it reveals in the regional prices of phone models that are sold in both regions. It is also that it reveals that relatively few phone models

are sold in both regions. Those that are, tend to be produced by Apple or Samsung and are generally positioned at the higher end of the market. As the total uncontrolled average price in **Figure 1** shows, nearly all these models were sold at prices well above the uncontrolled average price of all phones sold in India (USD 361).

There are three reasons for this:

- **Regional versions.** Some manufacturers sell different versions of the same model in different regions, one with superior parts, and the other with cheaper parts. For example, the Samsung Galaxy A14 in India has a different processor compared with the version in the USA.
- **Regional models.** Some manufacturers sell phones in both countries, but not the same models. Again, the phones' features differ, with cheaper prices attached to the phones with inferior technological features. For example: Motorola's most popular 5G phone in India, Edge 50 Fusion, was not sold in the USA; and its most popular 5G phone in the USA, the G Stylus, was not sold in India.
- **Regional manufacturers.** Some companies only target one region. For example, Transsion sold 0.8 million 4G and 5G phones in India per year, but none in the USA. These phones have basic features, limited brand value, and low prices. In the period of analysis, Vivo, Oppo, and Xiaomi sold over 84 million phones in India; Vivo and Oppo sold none in the USA, and Xiaomi sold less than 36,000.

Does this mean that 5G royalties should not vary at all by region? Not necessarily. But it does mean that a simple comparison of average phone prices cannot answer that question. Applying a 50% royalty discount based solely on differences in uncontrolled average prices cannot be supported. The results show that prices are broadly consistent across regions for phones with a given set of features. That should be the starting point when considering whether the royalty attributable to one of those specific features should likewise be consistent across regions, or whether it should vary.

3.2 Does consumer demand for the technology itself vary regionally?

The real question is whether the licensed technology itself adds more value to a product in some regions than others, and if so, why it does.

The answer isn't straightforward.

Considering whether consumer demand for the technology varies *directly*

Demand of the licensed technology may differ regionally *directly*. However, that does not necessarily alter the reasonable royalty for that technology.

The analysis of regional phone prices showed that *prices* tend to be consistent on a like-for-like basis. That does not show that consumer demand is necessarily the same for each phone in each country. It could be that the demand differs, but the *volume of sales* in each region reflect that difference, rather than product prices.

On that basis, the same may apply to royalties. The proportion of products that implement the technology may differ between regions, but the royalty per implementing unit will not.

Considering whether demand varies *indirectly*, with other product features

Consumer demand for the licensed technology may differ regionally *indirectly*.

Cellular technology may add more value when it is combined with complementary features whose value depends on access to data, such as large high-resolution screens, and fast processors. Conversely, it may add less value when it is not combined with those complementary features. On that basis, if true, a licensor may seek to charge a “premium” royalty rate in phones with premium complementary features, and a “basic” royalty rate in products that lack those features.

A supplier of physical components can manage complementarities of this kind by producing different *versions* of its product. If a manufacturer produces a single chipset, it must weigh up the trade-off between charging a high price to consumers with high willingness-to-pay and pricing out consumers with more limited needs. In contrast, if it produces a ‘premium’ version, and a ‘basic’ version, it can target each group separately catering to their specific needs.

A supplier of intellectual property may not be able to navigate complementarities by producing different versions of its *technology*. It is a non-rivalrous and non-excludable good: many can benefit from it simultaneously, and the licensor cannot prevent manufacturers from doing so (without intervention by a court).

However, in principle, it could achieve the same effect by offering different versions of its licence. If it charged a single price to all manufacturers, the licensor creates an unnecessary trade-off between charging a high price to those with high willingness-to-pay and pricing out those with more limited needs. In contrast, it could charge a “premium” royalty rate on products with premium complementary features, that benefit more from premium technology; and it could charge a lower basic rate on products that lack those features and therefore would benefit less.

This may indirectly lead to regional variation in royalties, simply because the mix of premium and basic complementary features varies from region to region.

Even so, that would still **not** motivate regional discounts. If there happens to be more “premium” users in some regions than in others, that will be borne out in demand for the features and prices of the phones themselves. A royalty can capture that type of variation directly, by using an *ad valorem* rate that scales with the product price (potentially subject to price and/or royalty caps and floors).

Whether or not royalties should be *ad valorem*, or a fixed amount per phone is a complex and polarised debate. However, it is the right debate to have, and it should be debated. If the value of the technology varies with the presence of complementary features, then from an economic perspective, that should be assessed directly, and reflected in a royalty that tracks “premium” and “basic” complementary features. If the value does not vary with the presence of complementary features, then a fixed unit rate should be used.

However, whatever the outcome of that debate is, an *ad valorem* royalty should not be smuggled into contracts through an adjustment for “regional scope”. That would either distort the royalty based on differences that are unrelated to the licensed technology, or double count an effect that has already been captured in the *ad valorem* royalty (or ASP adjustment).²¹

4 Does variation in patent coverage affect the royalties of global licences?

The next major justification advanced by those advocating for adjusting for the regional scope of a licence is patent coverage. Typically, patents play two roles in the negotiation of global SEP licences: as security, that protects the patent holder of valuable technology from free riding; and as an indicator of the innovator’s contribution to the value of the standardised technology as a whole. Problems occur when the two become conflated. Rates may also vary in line with a region’s attitude to patent enforcement.

In this section, we address each issue in turn.

4.1 Patents as security in global SEP licences

A **simplistic approach** to patents breaks down when analysing global SEP licences.

In response to that tension, courts have broadly identified three situations, where the relevance of weak patent coverage varies.

- **Two major parties:** In a negotiation between willing global manufacturers and large patent owners, there are enough “litigation grade” patents and enough products in the major jurisdictions that willing parties would simply focus on the value of the technology itself (rather than how adequately each patent is protected in each region).
- **A minor licensor:** Courts have posited that there may be a discount for weak patent coverage when negotiating with a small licensor with a small SEP portfolio. In that circumstance, courts have reasoned that the risk that none of the licensor’s portfolio is enforceable in a market may be significant enough to affect the reasonable rate.
- **A “Local King” manufacturer:** Courts have posited that there may be a discount for weak patent coverage when negotiating with a “local king” – a small manufacturer that operates in a regional niche, where the licensor has weak patent coverage.

We discuss each issue in turn.

The difficulty with simplistic approaches to patents

The logic of patent law is simple. Valuable technology can be difficult and costly to invent, but relatively easy and cheap to copy once invented. Without protection, therefore, we would not get enough valuable innovation, as the threat of “free riders” would deter it. Patents offer that protection. It provides the security that the patent holder needs to ensure it can monetise its inventions.

This logic encounters three potential difficulties in SEP licensing.

- First, once technology is standardised, it may face little competitive pressure from alternatives. The threat of an injunction may then exceed the value of the technology itself. That is the concern usually described as hold-up.
- Secondly, patents are territorial. In principle, a patent holder seeking to license technology to a global manufacturer would need patents in every jurisdiction where products are made or sold. So, any jurisdiction without a valid patent would be royalty free (assuming all infringing activity was limited to that jurisdiction only). In practice, however, that is untenable: filing everywhere would be costly and inefficient, particularly where expected sales are small. Exploiting territorial fragmentation in this manner to reduce licence fees is described as jurisdiction-by-jurisdiction hold-out.
- Thirdly, technology standards involve thousands of declared SEPs. There is a conceptual difficulty with this issue, and a practical one. Conceptually, the patents are complements: their value often lies in their joint contribution to the standard, not the aggregate of their individual contributions assessed in isolation. Practically, it would also be prohibitively expensive to assess every patent before agreeing a licence. Using such challenges to raise the cost of licensing is described as patent-by-patent hold-out.

The FRAND commitment, enforced through courts and arbitrators, is intended to mediate both hold-up and hold-out, so that innovators have an incentive to contribute valuable technologies to standards, and manufacturers have an incentive to adopt those technologies.

Willing negotiations between two major parties would focus on value, not patent coverage

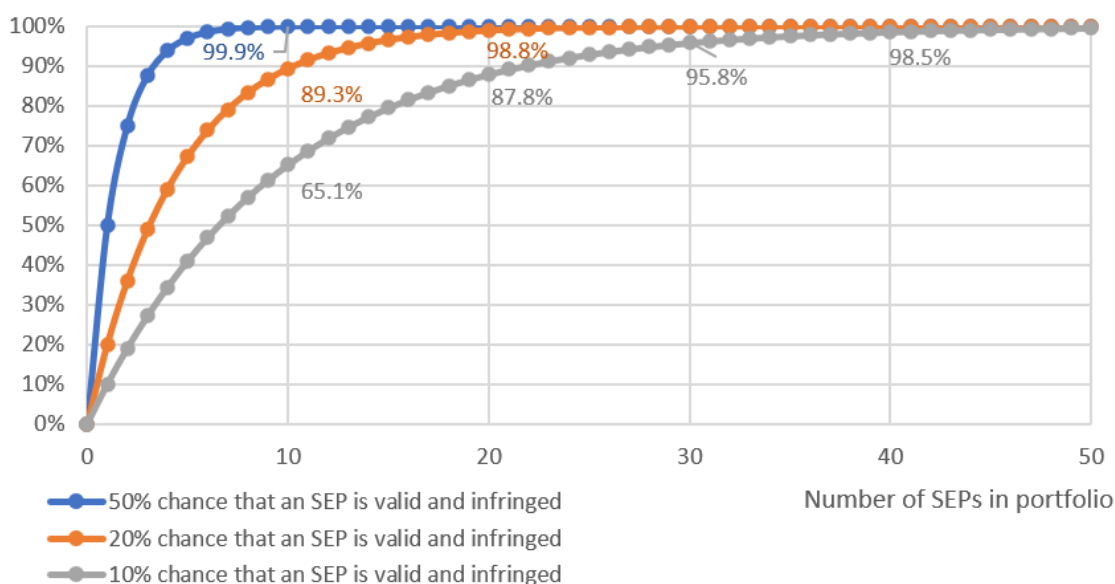
The purpose of a patent is to focus the parties on a discussion about reasonable terms of trade based on its value. In a simple setting, a licensee will not pay more than the value the technology provides; and the licensor will not accept terms that erode the value it could get through by other means, whether licensing the technology to third parties, or implementing it in its own products.²²

From an economic point of view, once a patent owner has sufficient patent coverage in a major patent jurisdiction that it can credibly enforce, then it has enough security to ensure a willing discussion about reasonable terms for the use of its technology. In this context, “sufficient” coverage can come in at least two ways, the licensor has:

- “Litigation grade” patents: SEPs that both parties know can be successfully enforced. This factor, for example, was discussed in *Samsung v ZTE*.²³
- Enough SEPs that the risk of none being enforceable is remote. For licensors with large SEP portfolios, like InterDigital, that point is reached relatively quickly. For those with portfolios with very few SEPs, like Unwired Planet, the risk that none are enforceable at all may be a material possibility. This is the distinction highlighted by Justice Mellor in *InterDigital v Lenovo*.²⁴

Figure 2 illustrates this second point: as portfolio size increases, the probability that the portfolio contains enforceable patents – i.e., because it contains at least one valid and infringed patent in that jurisdiction – rises quickly. Even if each declared SEP has a relatively limited chance of being valid, essential, and infringed, the chance that *none* of the portfolio is enforceable soon diminishes.

Figure 2: Probability that a portfolio contains enforceable patents



Source: Authors' analysis.

Once an enforceable threshold is reached in the main jurisdictions, the absence of patents in smaller jurisdictions matters less. In this situation, from an economic and commercial perspective, large rational and willing parties would simply focus on whether a patent holder has a sufficient

portfolio in each major jurisdiction. If so, they would then move directly to discussing the value of the technology with worldwide scope. Common sense and commercial logic explain why.

If the manufacturer insists on paying only for sales in patented jurisdictions and refuses to acknowledge the value of the technology in all jurisdictions, then the licensor must rationally respond with “defensive filing”: it files and enforces in those other markets too to mitigate its losses. It starts with the largest markets, but if compelled, then files and enforces in smaller markets too.

That is costly for both sides. Filings generate real costs (fees, prosecution, maintenance, translation, local agents), but produce no additional innovation benefit. They are simply a friction that a fragmented patent system imposes on the global technology market. Those costs are either recovered – increasing costs for licensees and their consumers in every market pay more – or reducing returns on innovation.

As willing and rational actors with foresight, the parties avoid this bad equilibrium. They simply agree the global rate without legal squabble that hurts them both.

However, some markets may be so small that even defensive licensing would not help the licensor: the cost of enforcement could exceed the potential revenue. In that case, the licensor would presumably abandon the value its technology provides to implementing products in that jurisdiction entirely. From a social perspective, this is madness. But from an individual’s perspective, it is a commercially rational strategy that a hard-nosed implementer might consider, and one that a rational licensor cannot respond against. However, it is not one that courts necessarily consider a willing licensee would pursue. It is a strategy that uses the fragmentation of patent law to cut across the commercial reality of global trade. That is hold out – or in Justice Meade’s less hostile terminology, which we prefer: a “non-FRAND factor” that affects the price.²⁵ Whichever terminology one uses, it is not what willing parties would agree to.²⁶

Exception 1: Lower rates for minor licensors with very small portfolios.

The contrast between *Unwired Planet v Huawei* and *InterDigital v Lenovo* is important. Unwired Planet had a small portfolio, including few SEPs in some jurisdictions. InterDigital had a much larger portfolio.

Unwired Planet faced a real possibility that, in key jurisdictions, it had no valid and infringed patents. In that situation, a discount may reflect the risk that the portfolio provides little or no enforceable protection there. In practical terms, a jurisdiction may be classified as an Other Market because patent coverage is insufficient.

InterDigital did not face the same risk. Its portfolio was sufficiently large in the main patent jurisdictions that no major market was likely to be discounted merely because of inadequate patent coverage. The point is not that large portfolios are immune from scrutiny. It is that the reason for a patent-coverage discount is weaker once the portfolio is large enough to make enforcement credible across the main markets.²⁷

Exception 2: Lower rates for “local kings”, implementers with regional niches.

Regional discounts may also arise on the licensee side. If a manufacturer does not have global sales or production across the major patent jurisdictions, its commercial exposure to the licensor’s portfolio may be different. In the extreme case, where sales and manufacture are concentrated in territories where the licensor has little patent coverage, those sales may justify a lower rate or be less useful in a comparable contracts analysis.²⁸

TCL v Ericsson illustrates the point. Global manufacturers, such as Apple and Samsung, were closer comparables to TCL than manufacturers with narrower geographical footprints. Two geographically concentrated manufacturers, Coolpad in China and Karbon in India, were treated as not comparable with a global manufacturer.

The principle matters more than the particular classification in a given case. Markets develop, and circumstances change. The relevant question is, based on the facts at the time, whether the manufacturer's actual sales and manufacturing footprint changes the bargain that willing parties would strike.

4.2 Patents as indicators of value

For a global licence with a major licensor, the number and quality of patents still matters. A licensor that can enforce in major jurisdictions cannot simply name its price. The royalty should reflect the value of the licensed technology. The challenge is how to assess that value without falling into jurisdiction-by-jurisdiction litigation or patent-by-patent hold-out.

A practical starting point that parties may use is the licensor's share of the global stack of patent families. Patent families group patents in different jurisdictions that protect the same invention. A licensor with 10% of *global SEP families* does not necessarily own 10% of the patents in *each* jurisdiction; it may do, but may only have a patent in one of the relevant regions.

When deciding the composition of its global portfolio, a licensor needs to take into account two factors that work in opposite directions:

- **Enforceability in each major region:** At a minimum it needs a sufficient number of SEPs in each major jurisdiction for its rights to be enforceable globally. To the extent that parties and courts are likely to use regional patent strength as an indicator of value in each region, it may also need to file patents beyond that threshold.
- **Avoiding the duplication of costs:** Filing the same technology in each patent jurisdiction simply duplicates costs. As discussed above, duplicating filings everywhere increases costs without increasing value. From a purely economic perspective, a global patent jurisdiction would be preferable.

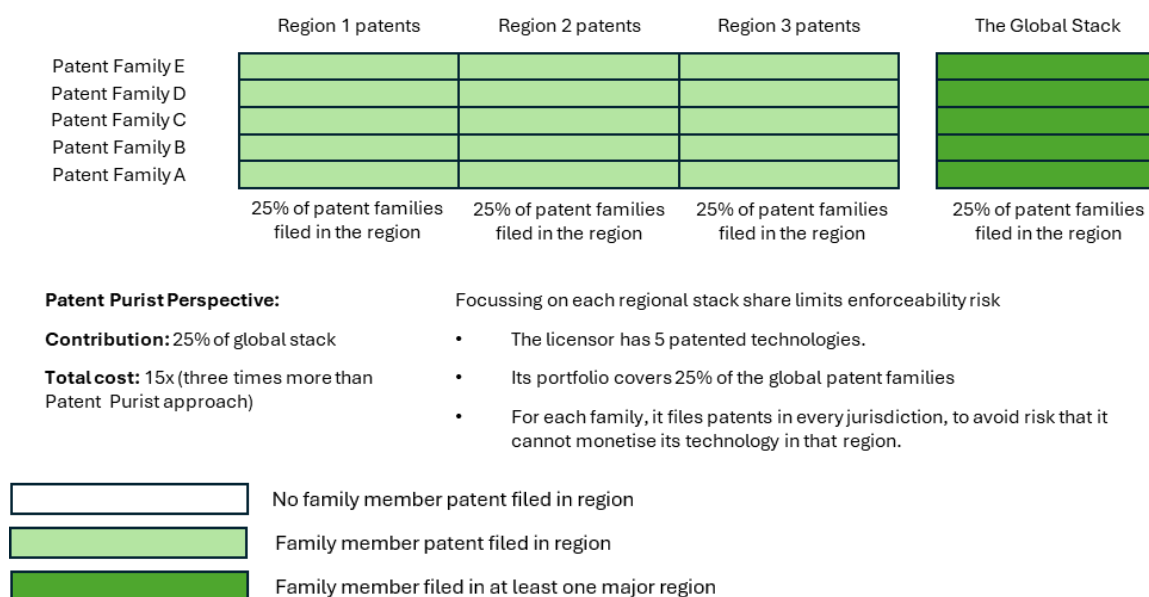
Balancing these risks affects the composition of a global portfolio and its likely costs and revenue. Here we illustrate that by comparing two scenarios: the first we have labelled the “**Commercial Purist Perspective**”, where the licensor seeks to minimise the duplication of costs; and the second the “**Patent Purist Perspective**”, where the licensor seeks to minimise the risk that perceptions about the enforceability of its portfolio in *each* region prevent it from securing the reasonable value of its technology in each region

Figure 3 considers how the composition of the hypothetical global patent portfolio would be designed using the Commercial Purist Perspective. Here, the parties assess the portfolios from a regional and global perspective. The licensor has sufficient coverage in the main jurisdictions to enforce its portfolio in each region: in each region it has patents that contribute to at least 5% of the global stack of patent families. However, it avoids any duplication across regions in two ways: (a) it only files a patent member for a particular family in one jurisdiction and (b) it spreads its portfolio, so that it has sufficient patent members in *each* jurisdiction. So, although it holds 25% of the global stack of patent families, its holding in any given region never exceeds 15% of those families. Nonetheless, the parties use the global share as a starting point when assessing the licensor's contribution to the standard, whether in a top-down analysis or when scaling a comparable licence

For each family, it files patents in only one jurisdiction, to avoid duplication

Figure 4 considers the significance of the composition of a hypothetical global patent portfolio would differ if designed using the Patent Purist structure. The parties assess the portfolio region by region only. If the licensor maintains the composition shown in **Figure 3**, its royalty revenue may fall dramatically. Rather than agreeing a global rate based on the licensor owning 25% of the global stack, the licensee would pay only 60% of that rate in Region 1 (15/25) and only 20% of the rate in regions 2 and 3 (5/25). To defend against that, the licensor has defensively filed a patent for *each* family in *each* region, increasing its costs. It then passes on those costs to the licensee.

Figure 4: Hypothetical composition of a global patent portfolio using the Patent Purist structure



Source: Authors' analysis.

In practice, portfolios may fall somewhere in between these two hypotheticals, depending on how the parties view the risks. For instance, willing parties would seek to avoid excessive duplication of costs. Although it may initially seem to both the licensor and licensee that it is common-sense to file every patent in every jurisdiction, it turns out to be irrational (other than on a strictly myopic assessment). Insisting on it makes *both* parties and consumers worse off. Conversely, however, parties may choose not to eradicate all duplication. From an economic perspective that would be ideal, but single-member families can be viewed as “brittle”, increasing the legal and commercial risks involved. For instance, it exposes the licensor to the risk that simplistic regional portfolio comparisons are used when valuing its portfolio; and there is a risk that courts or licensees may view single-member families sceptically, particularly if they are concentrated in one specific region.²⁹

Finally, a licensor's share of the global stack, as measured by simple patent counting, is not determinative. Both *Unwired Planet v Huawei* and *Samsung v ZTE* are clear on that point; their reasoning applies across all jurisdictions.³⁰ The proportion of declared SEPs a licensor owns may not reflect its true contribution to the value of the technology standard. Validity, essentiality, and technical importance vary across patents, and they should be accounted for. Although the average value per patent may vary less between different portfolios; it can still vary materially.³¹ Those differences justify adjustments, particularly where the evidence allows them to be assessed. But the global stack is a more coherent starting point than counting patents country by country and treating each uncovered jurisdiction as if the technology had no value there.

4.3 Variation in patent enforcement

A final potential difference with regional patent coverage is enforcement. Some jurisdictions, rightly or wrongly, have been associated with weak enforcement of intellectual property, such that it reduces the rate that parties would agree in that region – or, at least, it is argued to influence rates. Conversely, other jurisdictions, again rightly or wrongly, are identified as overly zealous enforcers, inflating rates.

Establishing how enforcement affects rates in practice is challenging to say the least. If a jurisdiction is not prepared to enforce intellectual property, then clearly there is little incentive for implementers to pay a FRAND rate. Similarly, if courts apply the patent limitation periods – as they would in a damages case – rather than consider that willing parties would agree a FRAND rate on all sales, then an implementer has less incentive to agree to terms quickly.³² Conversely, if parties face the immediate prospect of an injunction, they may be more likely to agree to a higher rate than they would otherwise. The challenge, in both cases, is establishing to what extent.³³

If an adjustment is fundamentally unreliable, it should be avoided. There are some cases where evidence is available. For instance, in 2015, the National Development and Reform Commission (NDRC) concluded its investigation into Qualcomm, under China's Anti-Monopoly Law. It found Qualcomm had abused a dominant position in SEP licensing and baseband chip supply. The practical outcome for SEP licensing was that Qualcomm agreed, for devices sold for use in China, to reduce the royalty base by 35% when calculating royalties. So, when parties subsequently negotiated terms in the shadow of China's approach to enforcement, that decision offered a rational focal point or a plausible "discount".³⁴

Conversely, some regions are considered relatively favourable to licensors seeking injunctions: Germany and Brazil, for instance. This, it is argued, increases the rate that parties would otherwise accept. That point was put forward in the recent *Samsung v ZTE* decision, and accepted by the court. In that case, it was used to adjudicate whether licences were comparable, not whether a regional discount (or uplift) should be applied. Compared with the China discount, this issue is harder to implement an adjustment in principle and practice. In principle, the reasoning is dubious: if licensees do not expect any risk of an injunction (mediated by a court), then there is no reason to believe that the rate they would agree to without that risk is FRAND. Practically, the scale of impact is unclear. It may be minor; it may not be. Unlike the NDRC's settlement, there is no hard evidence to guide the estimate.

5 Summary

This article has considered whether the reasonable value of an SEP licence varies by region and, if so, how that effect should be measured. Although the underlying rationale is plausible in principle, in practice, the claim often lacks evidential support and the methodologies used to calibrate the discounts are flawed.

Although consumer demand for a particular technology may vary between regions, that appears to affect volumes, not prices. The variation in uncontrolled average product prices between regions is irrelevant. The same product with the same features sells for roughly the same price wherever it is sold. The implication being that the same technology used in the same way would have the same royalty wherever it is used. While it may be the case the licensed technology adds more value to products with premium complementary features than it adds to products with basic ones, that is not an argument for some form of ad valorem pricing. If valid, it should be demonstrated and argued for directly, not smuggled in through regional adjustments.

There are cases where patent coverage affects rates. But a simple comparison of regional patent portfolios simply duplicates costs harming both sides, and reintroduces jurisdiction-by-jurisdiction hold-out by another avenue. The claim ignores the commercial reality of increasing transaction, monitoring, and reporting costs that come with more regionally granular contracts. From an economic perspective, analysing global patent families, regardless of the number of members in each family, can mitigate those costs.

So, even where accounting for regional variation may improve a valuation in principle, typically, it makes it worse.

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Unwired Planet v Huawei [2017] EWHC 711 (Pat), paragraph 543.

We use “royalty terms” broadly, capturing all forms of consideration, whether monetary or non-monetary. In contrast, we refer to differences in “regional scope” narrowly. Strictly a difference in regional scope would capture any difference in the territories covered by the contract. However, this paper addresses the specific question, which is whether SEPs in some regions have a different value to SEPs protecting the same technology in other regions.

Specifically, as discussed below, these are (i) TCL v Ericsson [2017] No. 8:14-cv-00341, (C.D. Cal.); (ii) Unwired Planet v Huawei [2017] EWHC 711 (Pat); (iii) InterDigital v Lenovo [2023] EWHC 539 (Pat); and (iv) Nokia v Oppo [2023] from a translation of The People’s Republic of China Chongqing First Intermediate Court (2021 Yu 01 Minchu no. 1232).

Technically, these “discounts” are simply a methodological device to recognise that the reasonable price in each region is thought to differ. We use the term in that sense, as it is widely used and does no harm if interpreted in that way.

For a discussion of the value of a licence, see WIPO (2026), “FRAND Economics: Valuing Methods in Licensing Standard Essential Patents”, Part 1.

We use the term “licence” generally, as the same principle is true for a non-assert: where the licensee buys a patent holder’s agreement *not* to enforce its rights for duration of the licence term. Although, superficially, the value of the non-assert is the benefit of avoiding exclusion from using the technology, that leads one astray if we take the value that the implementer gains from access to the patented technology itself for granted.

Samsung v ZTE [2026] EWHC 999 (Pat), paragraph 92.

In addition, Samsung v ZTE applies the same approach to regional discounts on the basis that (a) it is the approach adopted in these other judgments and (b) in the particular case of Samsung v ZTE the application of that approach was not challenged in principle or practice. See Samsung v ZTE [2026], paragraphs 497-498. Discounts on past sales and the application of limitation periods to SEP licences are an example of a practice that was both common and considered to be non-FRAND by courts. See Ericsson v Lenovo [2025], EWCA Civ 182, paragraph 23.

For instance, Unwired Planet v Huawei [2017], paragraphs 544, 587. Some patent pools apply a similar approach. For instance, Via-LA’s AAC pool allocates countries into one of two regions, applying a discount to second group, see Samsung v ZTE [2026], paragraph 498.

The significance of changing circumstances is emphasised in Interdigital v Lenovo [2023] paragraph 751 “Whilst I agree that a discount for Emerging Markets is appropriate, these data raise the question of whether it remains appropriate to apply a 50% discount to China. I do not know the data which was used to justify that 50% discount being applied originally, but these ASP data suggest the picture as regards China has changed significantly.”

See Unwired Planet v Huawei [2017], paragraph 583: “The appropriate rate for China is not complicated to arrive at. The comparable licences show that rates are often lower in China than for the rest of the world. The relative factor varies. I find that a FRAND licence would use a factor of 50%.”

See *Unwired Planet v Huawei* [2017], paragraph 583, and the discussion of this point in *Interdigital v Lenovo* paragraph 757 i), which states “In [582]-[583], Birss J adopted a factor of 50% for China, based on comparables which showed that rates were often lower for China than for the rest of the world, but varied. In context, this adjustment had nothing to do with patent coverage but was founded on economic circumstances – a point confirmed by the fact that Birss J. went on to consider patent coverage in the next few paragraphs.”

See *Interdigital v Lenovo* [2023]. The discussion at paragraph 751 clearly uses this data to explain commercial practice stating that “I do not know the data which was used to justify that 50% discount being applied originally, but these ASP data suggest the picture as regards China has changed significantly.” Further, in paragraph 753, the court stated it should use the relevant data that was then available, which may then influence commercial practice, noting “If the data is available which supports a more refined analysis, I consider the Court should adopt the more refined analysis. Each such step should lead to a more precise estimation of FRAND terms. If that means that the Court’s decision modifies the approach in future licensing negotiations, so be it.”

Samsung vs ZTE followed the same approach, largely because that evidence had been adopted in previous decisions, was the most objective evidence available, and it was unchallenged in the particular case. In our view, the data is misleading; it does not justify a discount of that scale, and potentially suggests there should be no discount at all. See paragraphs 498-499 (emphasis added). “498. ... Samsung argued for 50% on the basis of what has been applied in case law such as UPHC and InterDigital HC, the regional discount offered by the Access Advance HEVC Patent Pool, and Dr Lopez’s data on industry-wide ASPs between each relevant region for 4GMM and 5GMM handsets. 499. I prefer Samsung’s position. The most objective evidence is that of Dr Lopez on handset prices, which was not challenged in cross examination, and that drives my conclusion on this point.” *Samsung v ZTE* [2026], paragraphs 498-499.

TCL v Ericsson [2017], No. 8:14-cv-00341, (C.D. Cal. Dec. 21, 2017) slip op. at 44, *amended and superseded* (C.D. Cal. Sept. 14, 2018), *rev’d in part, vacated in part* 943 F.3d 1360 (Fed. Cir. 2019), *cert. denied* 141 S.Ct. 239 (2020).

A translation of *Nokia v Oppo* [2023], The People’s Republic of China Chongqing First Intermediate Court (2021 Yu 01 Minchu no. 1232), page 90 (‘Reasoning’ Section III. (II) 5.).

See *Interdigital v Lenovo* [2023], paragraph 807, for the reasons given in 761-772.

Samsung vs ZTE proves a useful summary of the relevant principles. Specifically highlighting this point, J Meade notes at paragraph 134, that “The experts also agreed that when considering comparable licences, the fewer adjustments needed to account for differences between the comparable licence and the licence being negotiated the better (with a caveat added by Mr Lin, which I accept, that it is important to recognise that it is not just the number of adjustments that matters; the extent of each adjustment is equally significant).” See *Samsung v ZTE* [2026], paragraph 134.

Samsung v ZTE emphasises the distinction raised in *Optis v Apple* [2025] EWCA Civ 552, paragraphs 90-91, between (a) evidence that is “not comparable” and (b) evidence that “is not reliable”, *Samsung v ZTE* [2026], paragraphs 97-100. Applying that distinction, J Meade notes that [contracts] could be adjusted in principle, but in practice those adjustments cannot be made reliably enough for him to rely on them, *Samsung v ZTE* [2026], paragraphs 29, 285.

Analysis that accepts a per unit rate, but then adjusts for differences in the ASPs, has the same effects as an ad valorem royalty. Adjusting for both ASP and regional scope (when that regional adjustment is based on ASPs) also double counts the same underlying driver.

For a detailed discussion of willingness to accept and willingness to pay, see WIPO (2026), Part 4, particularly 4.1.1, 4.2.1.

Samsung v ZTE [2026], paragraph 129.

InterDigital v Lenovo [2023], paragraphs 758, 791.

Samsung v ZTE [2026], paragraph 37.

For the avoidance of any doubt, such behaviour can be non-FRAND without implying and wrongdoing from an antitrust perspective, as reiterated in *Samsung v ZTE* [2026], paragraph 92.

InterDigital v Lenovo [2023], paragraphs 758, 791.

If, however, all products are manufactured in a single country, this provides a “manufacturing floor”. In *Unwired Planet v Huawei*, for instance, all Huawei’s phones were manufactured in China. Therefore, rates could not be discounted below the rate that applied to China, regardless of where the product was sold. See *Unwired Planet v Huawei* [2017], paragraphs 540, 589, 807.

For instance, see the discussion of single-member families in *Samsung v ZTE*, paragraph 301

Unwired Planet v Huawei [2017], paragraphs 181, 184; *Samsung v ZTE* [2026], paragraphs 313-314.

See discussion of “average value” in WIPO (2026), Section 5.

³² InterDigital v Lenovo [2023], paragraph 529; Ericsson v Lenovo [2025], paragraph 23.

³³ Samsung v ZTE [2026], paragraphs 28, 347, 376.

³⁴ A translation of Nokia v Oppo [2023], pages 48 ('Fact Findings' Section V. (I) 1.), 66 ('Fact Findings' Section VI. (III)).