



Apportionment in Determining Reasonable Royalty Damages:

Legal Principles, Practical Considerations and Countervailing Viewpoints

This paper was created by members of the Intellectual Property Owners Association Damages and Injunctions Committee to provide background to IPO members. It should not be construed as providing legal advice or as representing the views of IPO.

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I. SCOPE OF PAPER

The Damages and Injunctions Committee of the Intellectual Property Owners Association (IPO) is pleased to present this white paper on apportionment. Our goal in presenting this paper is twofold. First, we have sought to provide a neutral exposition of background law regarding principles of reasonable royalty damages in patent infringement lawsuits, focusing on the legal, economic, and policy-based requirements to apportion damages to the footprint of the invention. Second, recognizing that IPO's membership comes to the subject from different perspectives, we have also sought to present point/counterpoint discussions to bring out arguments on both sides of common disputes relating to apportionment. We hope IPO's membership finds this to be a helpful resource and a thought-provoking starting point for further analyses and discussion.

II. LEGAL BACKGROUND

A. Introduction to Apportionment

Damages for infringement shall be “adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer.” 35 U.S.C. § 284. Although the statute is simply stated, determining what constitutes a reasonable royalty has proven to be anything but. A reasonable royalty can be a lump sum, a royalty base reflected in revenues multiplied by a royalty rate, a royalty base reflected in units multiplied by an amount per unit, or a combination thereof. However expressed, the goal of reasonable royalty damages is to compensate the patent holder for the value of the patented technology based on the infringer's use of that technology. *Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1226 (Fed. Cir. 2014).

The concept of apportionment in patent damages was first introduced by the Supreme Court well over 100 years ago in *Garretson v. Clark*, 111 U.S. 120 (1884). The patent at issue

was for a mop head clamp, but the plaintiff sought damages based on sales of the entire mop apparatus. *Id.* at 121. The Court held that this was an error:

The patentee, ... must in every case give evidence tending to separate or apportion the defendant's profits and the patentee's damages between the patented feature and the unpatented features.

Id. Consistent with *Garretson*, the Federal Circuit has emphasized that “a reasonable royalty analysis requires a court to carefully tie proof of damages to the claimed invention’s footprint in the market place.” *Virnetx, Inc. v. Cisco Sys., Inc.*, 767 F.3d 1308, 1327 (Fed. Cir. 2014) (quotation marks, ellipses, and citations omitted). Apportionment is one way courts have hewed to this mandate.

Courts have recognized an exception to the apportionment requirement known as the entire market value rule, or EMVR. Under the EMVR, to be excused from the need to apportion, a patentee:

must show ... that the profits and damages are to be calculated on the whole machine, for the reason that the entire value of the whole machine, as a marketable article, is properly and legally attributable to the patented feature.

Garretson, 111 U.S. at 121. The EMVR relieves a patentee from apportioning its damages only when the patentee can show that “the patent-related feature is the ““basis for customer demand.”” *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1549 (Fed. Cir. 1995).

B. Apportionment Where Damages Are Calculated By Multiplying a Base by a Rate

1. The Smallest Salable Patent Practicing Unit

In many cases, patentees calculate their reasonable royalty damages by multiplying a royalty rate by a royalty base. When damages are calculated in this way and the EMVR is not satisfied, many courts have required that the royalty base be apportioned by limiting it to the smallest salable patent-practicing unit (SSPPU).

Cornell Univ. v. Hewlett-Packard Co., was an early case applying the SSPPU requirement. 609 F.Supp.2d 279, 288 (N.D.N.Y. 2009) (Rader, J., sitting by designation). In that case, Cornell asserted a patent on an instruction issuing mechanism within a processor, but first sought damages based on sales of the entire computer and then the value of the smaller CPU brick which housed the processor. *Id.* The court held that this was improper because the royalty base must be apportioned down to “the smallest salable infringing unit with close relation to the claimed invention—namely the processor itself.” *Id.*

Cornell set the stage for *Lucent Techs., Inc. v. Gateway, Inc.*, where the infringing feature was the date picker function in Microsoft Outlook. 580 F.3d 1301 (Fed. Cir. 2009). The court rejected the plaintiff’s use of revenues from the sale of entire computers as the royalty base because there was no evidence that the date picker function in Outlook drove consumer demand for computers. The court suggested that the royalty base would have to be apportioned down at least to Outlook itself and possibly even further. The decision thus implied that apportioning through the base was the appropriate method in this particular case. However, while recognizing that “our law states certain mandatory conditions for applying the entire market value rule,” *Lucent* also left the door open to the possibility that damages could, in appropriate circumstances, be apportioned through the royalty rate:

Simply put, the base used in a running royalty calculation can always be the value of the entire commercial embodiment, as long as the magnitude of the rate is within an acceptable range (as determined by the evidence).

* * *

There is nothing inherently wrong with using the market value of the entire product, especially when there is no established market value for the infringing component or feature, so long as the multiplier accounts for the proportion of the base represented by the infringing component or feature.

Id. at 1338-39.

Swinging the pendulum in the other direction, the Federal Circuit in *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292 (Fed. Cir. 2011) and *LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694 F.3d 51 (Fed. Cir. 2012) emphasized that the entire product should not be used as the base unless demand for the entire product is attributable to the patented feature. In *Uniloc*, the court held that

[t]he Supreme Court and this court's precedents do not allow consideration of the entire market value of accused products for minor patent improvements simply by asserting a low enough royalty rate.

In so holding, the Federal Circuit reasoned that:

[t]he disclosure that a company has made \$19 billion dollars in revenue from an infringing product cannot help but skew the damages horizon for the jury, regardless of the contribution of the patented component to this revenue.

Uniloc, 632 F.3d at 1320. And in *LaserDynamics*, the court reaffirmed the conclusion and reasoning of *Uniloc*:

We reaffirm that in any case involving multi-component products, patentees may not calculate damages based on sales of the entire product ... without showing that the demand for the entire product is attributable to the patented feature. ... [T]he requirement to prove that the patented feature drives demand for the entire product may not be avoided by the use of a very small royalty rate.

* * *

Admission of such overall revenues ... only serve to make a patentee's proffered damages amount appear modest by comparison, and to artificially inflate the jury's damages calculation.

LaserDynamics, 694 F.3d at 67-68.

In *Ericsson*, the court explained that the SSPPU requirement is an evidentiary rule more than a substantive rule:

It is not that an appropriately apportioned royalty award could never be fashioned by starting with the entire market value of a multi-component product—by, for instance, dramatically reducing the royalty rate to be applied in those cases—it is that reliance on the entire market value might mislead the jury.

773 F.3d at 1227. Some have interpreted this passage to suggest that apportioning through the royalty rate may be permissible if an appropriate methodology is applied. An appropriate methodology, in this view, is one that would avoid misleading the jury is avoided such as, for example, by tailoring the way the evidence is presented to the jury so as not to present total sales revenues. Others have disagreed, arguing that this excerpt in fact reaffirms the core rationale of *Uniloc* and *LaserDynamics*: the likelihood of jury confusion that would result from the use of a larger royalty base in front of a jury warrants excluding that evidence.

In any event, under current law, where the EMVR is not satisfied, *Uniloc*, *LaserDynamics*, and *Ericsson* recognize that a risk of skewed damages awards may result if overall product revenues are presented to the jury. Thus, in situations where damages are calculated by multiplying a royalty base by a rate, these cases seem to require that the base represent sales attributable to the smallest salable patent practicing unit or smaller.

2. Situations Where the SSPPU Incorporates Several Technologies: Apportioning Below the SSPPU

Identifying the proper royalty base may present a relatively easy task when the infringing feature itself is a commercially available, separately-sold component. A more complex situation arises when the infringing feature is not sold separately. The Federal Circuit addressed this fact pattern in *VirnetX*. There, the infringing technology was a method of network connectivity used in the iPhone FaceTime app. The court held that although the iPhone was the SSPPU,

the requirement that a patentee identify damages associated with the smallest salable patent-practicing unit is simply a step toward meeting the requirement of apportionment. Where the smallest salable unit is, in fact, a multi-component product containing several non-infringing features ... the patentee must do more to estimate what portion of the value of that product is attributable to the patented technology.

Uniloc, 632 F.3d at 1327. The court reasoned that practical and economic necessity is no exception to the entire market value rule. *Id.* at 1329. The patentee “cannot simply hide behind

[the infringer's] sales model to avoid the task of apportionment.” *Id.* at 1329. Thus, based on *VirnetX*, where the SSPPU itself contains infringing and non-infringing features, the royalty base must be apportioned down further such that it does not include any non-infringing features. Indeed, the royalty base must be tied to the footprint of the invention. *Id.* at 1329. Non-infringing features may only be included when the EMVR is satisfied.

3. *Exmark* and Apportionment Through the Royalty Rate

While many of the foregoing cases emphasize the need to apportion through the royalty base, the Federal Circuit has also recognized situations where apportioning through the royalty rate is required or appropriate. The court squarely addressed this question in *Exmark Mfg. Co. v. Briggs & Stratton Power Prods. Grp., LLC*, 879 F.3d 1332 (Fed. Cir. 2018). In that case, the claim at issue recited an entire lawnmower, but the novel feature was a baffle. In that situation, the court affirmed the use of revenues from sales of the entire claimed lawnmower as the royalty base. The court cited language from *Lucent* and *Ericsson* reasoning that:

[s]o long as Exmark adequately and reliably apportions between the improved and conventional features of the accused mower, using the accused mower as a royalty base and apportioning through the royalty rate is an acceptable methodology.

Exmark, 879 F.3d at 1348. *Exmark* is thus the first Federal Circuit opinion post-*Lucent* to permit apportionment through the royalty rate instead of the royalty base.¹ In reaching its decision, the Federal Circuit relied on the fact that the patent at issue claimed the entire lawn mower, a prior comparable agreement used the entire lawn mower as part of the base, and using the entire lawn mower as the base was consistent with market realities.

Some have found particular significance in the fact that in *Exmark*, the claims were drawn to the entire lawn mower, such that the lawn mower was the SSPPU. Under this view,

¹ The Federal Circuit, however, vacated and remanded the damages award because the patent owner's damages expert's royalty base "lacked sufficient ties to the facts of the case." *Id.* at 1351.

there is no inconsistency between *Exmark* and prior case law. Indeed, under this view, *Exmark* is consistent with cases like *VirnetX* in the sense that, even where the SSPPU has been identified, further apportionment may still be required--here, in the rate.

Others have pointed to language in *Exmark* suggesting that its holding might not be limited to situations where the claim scope is coterminous with the SSPPU, and have argued that *Exmark's* holding represents a significant erosion of the entire market value rule. Under this view, there is a contrast between the *Exmark* case and *Finjan, Inc. v. Blue Coat Sys., Inc.*, 879 F.3d 1299 (Fed. Cir. 2018), decided just two days earlier, as well as the Federal Circuit cases decided post-*Lucent*, discussed above.

In *Finjan*, the Federal Circuit rejected the use of a royalty base containing non-infringing features on the ground that the base was not sufficiently apportioned--even though the base was the SSPPU. As in *VirnetX*, in *Finjan*, the Federal Circuit stated that a multi-feature SSPPU can only be used as the royalty base if the infringing feature is the basis for customer demand. Otherwise, the royalty base must be apportioned to reflect “the incremental value that the patented invention adds to the end product.” *Finjan*, 879 F.3d at 1311. There was no suggestion in *Finjan* that apportionment only in the royalty rate could be an appropriate substitute.

Most recently, the Federal Circuit addressed the issue of apportionment in *Power Integrations, Inc. v. Fairchild Semiconductor Int’l, Inc.*, 904 F.3d 965 (Fed. Cir. 2018). In this case, without mentioning *Exmark* but relying on *Uniloc*, *LaserDynamics* and *VirnetX*, the Federal Circuit re-emphasized that the royalty base should not be larger than the smallest salable unit and that, where the SSPPU is itself a multicomponent product, the royalty base must be apportioned even further. The Federal Circuit also addressed the EMVR stating:

As *LaserDynamics*, *Versata*, and *VirnetX* held, the entire market value rule is appropriate only when the patented feature is the sole driver of customer demand

or substantially creates the value of the component parts. The burden of proof in this respect is on the patent holder. The question is whether the accused product, compared to other products in the same field, has features that would cause consumers to purchase the products beyond the patented feature, i.e., valuable features. Where the accused infringer presents evidence that its accused product has other valuable features beyond the patented feature, the patent holder must establish that these features do not cause consumers to purchase the product. A patentee may do this by showing that that patented feature “alone motivates customers to purchase [the infringing product]” in the first place. But when the product contains multiple valuable features, it is not enough to merely show that the patented feature is viewed as essential, that a product would not be commercially viable without the patented feature, or that consumers would not purchase the product without the patented feature. When the product contains other valuable features, the patentee must prove that those other features do not cause consumers to purchase the product.

Id. at 979 (internal citations omitted).

C. Apportionment Where Damages Are Calculated Based on a Per-Unit Fixed Royalty

The cases discussed thus far address royalties calculated using a royalty base expressed as revenues multiplied by a rate. Other damages models also exist, such as ones in which royalties are calculated by multiplying a fixed royalty dollar value by the number of units sold. Such a damages model may not lend itself to the use of the SSPPU. In *CSIRO v. Cisco Sys, Inc.*, 809 F.3d 1295 (Fed. Cir. 2015), the Federal Circuit affirmed a damages award based on a fixed dollar rate multiplied by the number of units, and held that all reasonable royalty models need not begin with the SSPPU—such a requirement would be “untenable.” *Id.* at 1303. Rather, reasonable royalty models may begin with comparable licenses, even if those licenses “express the royalty rate as a percentage of total revenues, rather than in terms of the smallest salable unit.” *Id.* An acceptable model, according to the Federal Circuit, may “begin[] with rates from comparable licenses and then account[] for differences in the technologies and economic circumstances of the contracting parties.” *Id.* (quotation marks and citation omitted).

Underpinning the court’s approval of such an analysis is that the per-unit royalty, having been derived from comparable licenses, “already built in apportionment.” *Id.* “Put differently, the parties [to the comparable licenses] negotiated over the value of the asserted patent, and no more.” *Id.* Because apportionment was already accomplished by the selection of comparable licenses, no further apportionment was required in this situation.

III. USE OF PRIOR COMPARABLE AGREEMENTS

As we have seen, the law requires apportioning between patented and unpatented features to ensure that the damages award fairly represents the footprint of the invention, and no more. And jurisprudence on apportionment has, in most cases, required that, in cases involving base as expressed as revenues-and-rate damages models applied to multi-component or multi-feature products, the royalty base must be the smallest salable patent practicing unit unless the patent owner can establish that a larger royalty base satisfies the EMVR. *LaserDynamics*, 694 F.3d at 67. If the SSPPU itself is a multi-component or multi-feature unit, additional apportionment may still be required. *See, e.g., VirnetX*, 767 F.3d at 1327-8.

A common methodology for calculating patent damages relies on evidence provided by real-life comparable license agreements, where the royalty base may not actually be apportioned.² For example, a comparable license agreement may provide for a royalty on an entire machine, where only a small feature of that machine is patented. Strict application of the

² Indeed, the first two *Georgia-Pacific* factors specifically contemplate consideration of prior agreements of the parties, and other license agreements may be considered under *Georgia-Pacific* factor 12. The first *Georgia-Pacific* factor considers “[t]he royalties received by the patentee for the licensing of the patent in suit, proving or tending to prove an established royalty.” *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970). The second *Georgia-Pacific* factor considers “[t]he rates paid by the licensee for the use of other patents comparable to the patent in suit.” *Id.* *Georgia-Pacific* factor 12 addresses “[t]he portion of profit or selling price that may be customary in the particular business or in comparable businesses to allow for the use of the invention or analogous inventions.” *Id.* As discussed in more detail below, in using prior agreements, the issue generally boils down to whether the prior agreement is “comparable” to the hypothetical negotiation.

apportionment requirement may require creative economic analysis to determine an appropriate royalty base.

A. Identifying and Using Comparable License Agreements

Before addressing how one might apportion in view of comparable license agreements, we first address how to determine whether a license agreement is indeed comparable. *See ResQNet.com v. Lansa, Inc.*, 594 F.3d 860 (Fed. Cir. 2010). Comparability is generally analyzed by considering whether the prior agreement and the hypothetical negotiation involve comparable technology, comparable economic circumstances, similar structure (*i.e.*, lump sum v. running royalty as a percentage of sales, running royalty as an amount per unit) and arise under comparable circumstances. *See generally, VirnetX*, 767 F.3d 1308, *LaserDynamics*, 694 F.3d 51; *ResQNet.com*, 594 F.3d 860; *Lucent*, 580 F.3d 1301. And, if an agreement is not “sufficiently comparable” to the circumstances of the case being litigated, the agreement should be excluded. *Id.* at 871 (“re-bundling licenses simply have no place in this case”); *see also LaserDynamics*, 694 F.3d at 80 (district court “erroneously permitted continued reliance on [prior license] evidence where comparability between it and a hypothetical license to the [asserted patent] was absent).

Courts recognize that prior licenses “are almost never perfectly analogous to the infringement action.” *Ericsson*, 773 F.3d at 1227. Accordingly, “[t]estimony relying on licenses must account for such distinguishing facts when invoking them to value the patented invention.” *Id.* Even prior licenses that are markedly different from the hypothetical negotiation might be capable of supporting a reasonable royalty theory, so long as the expert appropriately accounts for the differences. *See e.g., Lucent* 580 F.3d at 1335 (vacating damages award and ordering new damages trial, but recognizing that “we do not conclude that the aforementioned license agreements [] cannot, as a matter of law, support the damages award in this case”). The more

similar the prior agreements are to the hypothetical negotiation, the less the justification for adjusting the base and/or rate from the prior agreements; and the more dissimilar they are, the higher the justification for adjusting the base and/or the rate.

1. Evaluating Technological Comparability

In evaluating technological comparability, courts will not tolerate “loose or vague comparability between different technologies.” *LaserDynamics*, 694 F.3d at 79. Licenses in “the same general computer field” are not technologically comparable without showing the relationship to the patented technology or the accused infringing products. *Lucent*, 580 F.3d at 1325, 1332. Merely stating that a prior agreement has “similar ‘telephony related functionality’ and ‘operational benefits’” is not sufficient detail to support technological comparability. *Sprint Commc’ns Co. L.P. v. Comcast IP Holdings, LLC*, Case No. 12-1013-RGA, 2015 WL 456154, *2 (D. Del. Jan. 30, 2015). Not surprisingly, actual licenses to the patented technology are considered highly probative. *LaserDynamics*, 694 F.3d at 79. In evaluating technological comparability, some of the issues experts should consider are the similarity of the licensed technology to the litigated technology, whether the patent claims are directed to the end-product or a component, and the importance of the licensed technology versus the litigated technology to the licensee/accused infringer and the industry. Reliance on a prior license should take into account the extent to which the previously licensed patents and patents-in-suit are similarly “fundamental” in their field. *W.L. Gore & Associates, Inc. v. C.R. Bard*, Case No. 11-515-LPS-CJB, 2015 WL 12731924 *6 (D. Del. Nov. 4, 2015). Any differences should be accounted for in the hypothetical negotiation royalty base and/or rate.

2. Evaluating Economic Comparability

In evaluating economic comparability, the following economic variables in prior licenses should be accounted for when using a prior agreement in a reasonable royalty analysis.

a. The relationship between the parties.

Consider whether the relationship between the parties to the agreement is one of competitors, inventor-manufacturer, inventor-distributor, or manufacturer-distributor. Consider also where each of the parties is in the chain of distribution—*e.g.*, licensor/licensee as the manufacturer of a commercial product versus licensor/licensee as the manufacturer of a component part versus licensee as a distributor-- and how that compares to the relationship of the patentee and the accused infringer. For example, one court determined that a prior agreement between an inventor and manufacturer was “not instructive as to an established royalty” that would occur between competitors based on the different economic relationships. *World Wide Stationary Mfg., Co. v. Bensons Int’l Sys. Inc.*, 3:11cv523, 2012 WL 3241835, *6 (N.D. Oh. Aug. 7, 2012).

Mischaracterizing the relationship of the parties to a prior agreement may irrevocably taint a damages opinion. In one case, for example, the relationship between the parties to a prior agreement was mis-described as supplier and customer, where the parties were actually inventor and promoter. *Bowling v. Hasbro, Inc.*, C.A. No. 05-2295, 2008 WL 717741 (D. RI. Mar. 17, 2008). The court found this mischaracterization to be a critical flaw in a damages opinion. *Id.*

So, if the closest prior agreement is between parties with a different economic relationship compared to the parties to the hypothetical negotiation, care must be taken to account for such distinguishing facts.

b. Identity of the parties in the prior agreement.

Consider whether the prior agreement includes the same parties as in the litigation, a subset of parties in the litigation, or exclusively third parties.

Adjustments may be necessary where a prior comparable agreement involved third parties, not present in the litigation. For example, the competitive positions of the third parties may be different compared to the litigants. The third parties may have different products, and even different business models compared to the litigants. *See Visteon Global Techs., Inc. v. Garmin Int'l, Inc.*, Case No. 10-cv-10578, 2016 WL 4727476 (E.D. MI, Sep. 12, 2016) (expert could consider prior agreement with third party, where expert expressly accounted for distinguishing facts such as different negotiation posture of parties to prior agreement); *Texchem Advanced Products Inc. Sdn. Bhd. V. e.PAK Int'l Inc.*, Case No. EDCV 12-1341 JGB (SPx), 2014 WL 12589656 (C.D. Cal. June 11, 2014) (denying without prejudice motion to exclude prior agreement with third-party that did not cover asserted patent, because it was not “radically different” from hypothetical agreement).

c. Timing of prior agreement in relation to the hypothetical negotiation.

Consider the timing of the agreement in comparison to the date of the hypothetical negotiation in the current litigation. Even where one party in the agreement is also involved in the litigation, where the agreement occurred a decade after the hypothetical negotiation, this “considerable temporal difference [] would have a dramatic effect on the economic positions of the negotiating parties.” *Sprint*, 2015 WL 456154, *2.

d. Finality of the agreement.

Consider whether the prior agreement is a final executed license, an unaccepted proposal, a draft, or merely a company policy. Evidence of licensing negotiations, without a final executed license, may be unreliable to support a reasonable royalty opinion. *See Whitserve, LLC v. Comput. Packages, Inc.*, 694 F.3d 10, 29-30 (Fed. Cir. 2012) (“patentees could artificially inflate the royalty rate by making outrageous offers” thereby reducing any possible evidentiary value of

licensing offers); *Powell v. Home Depot U.S.A., Inc.*, 663 F.3d 1221, 1241 (Fed. Cir. 2011) (unsuccessful negotiations merely representing “what an infringer would prefer to pay is not the test for damages”).

e. Volume of expected licensed products and materiality of expected royalty income.

Consider whether the volume of the expected licensed products and the volume of the accused products, as well as the resulting royalty payments, are similar or wildly divergent. Where the volume of sales and corresponding royalty payments are small, the parties may be willing to agree to very different financial terms than if the volume of sales and corresponding royalty payments are large. *See Summit 6, LLC v. Samsung Elecs. Co.*, 802 F.3d 1283, 1300 (Fed. Cir. 2015) (considering sales volume of accused products and those sold by comparable licensee in reasonably royalty analysis). Adjustments may be necessary to account for those differences.

f. Comparability of the structure of the prior agreement.

Consider whether the structure of the prior agreement is comparable to the structure of the hypothetical license. For example, to evaluate comparability of a prior lump-sum agreement in the context of a running-royalty, or vice versa, there must be some basis for comparison to recalculate the prior agreement and put the payments in the appropriate context. *Lucent*, 580 F.3d at 1330. Converting a lump-sum in a prior license to an implied royalty rate is unreliable if there is no information on the sales volume paid under the prior license. *Baltimore Aircoil Co. v. SPX Cooling Technologies, Inc.*, 2016 WL 4426681, *25 (D. Md. Aug. 22, 2016). Even where the prior agreement is between the parties in the litigation and covers the patent-in-suit, it may not be sufficiently comparable to be relevant to determining damages. In *CSIRO*, the district court determined a prior agreement was not comparable to the hypothetical negotiation even

though the prior agreement was between the licensee and a predecessor business to the defendant, and that prior agreement covered the patent-in-suit. 809 F.3d at 1299-30. The prior agreement was deemed not comparable by the district court for several reasons, including because it applied a percentage royalty based on chip prices, and the court determined that such a calculation provides no indication of the invention's actual value. *Id.* On appeal, the Federal Circuit found the district court's failure to consider the prior agreement to be erroneous, and remanded with instructions to reconsider its comparability. *Id.* at 1307.

g. Economic comparability of the parties.

Consider variables such as the relative size of the companies, economic viability of the companies, reputation of the companies in the industry, length of time the companies have been in business, and the companies' positions in the relevant market. Where a party to a prior agreement was facing imminent bankruptcy, consistently losing money and facing shareholder scrutiny, or had some other urgency to enter the agreement, this may impact the economic comparability to the hypothetical negotiation.

h. Scope of agreement.

Consider the scope of the prior agreement, the number of patents licensed, whether the license included other IP rights and know-how, whether the prior agreement was a cross-license, and other licensing terms that affect the value of the license.

Where a prior license covers an entire patent portfolio, other intellectual property, or services, the expert must evaluate sufficient evidence to weigh any economic differences with a hypothetical license just for the patent in suit. *LaserDynamics, Inc. v. Quanta Computer, Inc.*, No. 2:06-cv-348-TJW-CE, 2011 WL 7563818 (E.D. Tex. Jan. 7, 2011); *see also DataQuill Ltd. v. High Tech Computer Corp.*, 887 F. Supp. 2d 999, 1021-25 (S.D. Cal. 2011). For example, a license for nine U.S. patents, foreign patents, and patent applications is "quite different from" a

hypothetical negotiation for one patent. *Sprint*, 2015 WL 456154, *2 . Similarly, a prior agreement licensing multiple PC related patents was considered vastly different than a hypothetical negotiation for a single patent directed to a narrow method. *Lucent*, 580 F.3d at 1328. And, a prior agreement has been excluded from evidence because it involved 40 patents and resolved several lawsuits between competitors, whereas the lawsuit involved just three patents asserted by a non-competitor. *Multimedia Patent Trust v. Apple, Inc.*, Civil Action No. 10-11571-RWZ, 2012 WL 12868261 *2 (S.D. Cal. Oct. 23, 2012).

Furthermore, any additional knowhow licensed or to be provided in the prior agreement, such as technical or marketing support, must be accounted for or else the prior agreement risks being considered non-comparable. *See ResqNet.com*, 594 F.3d at 870. Any attempt to separate the value of the asserted patents from the rest of the value of the license must not be conclusory, and must be done in a methodologically sound way. *Skyhook Wireless, Inc. v. Google, Inc.*, 2015 WL 13620764 (D. Mass. Feb. 18, 2015).

i. Context of prior agreement and bargaining positions of the parties.

Consider the bargaining positions of the parties to the prior agreement, in comparison to the bargaining positions of the parties to the hypothetical negotiation, such as whether the prior agreement was a settlement agreement, arms-length negotiation, or leveraged license where one party faced imminent injunction or other economic urgency. If the prior agreement is a settlement agreement, consider the extent to which the financial terms were influenced by the desire to avoid the risk and expense of litigation. *Prism Techs. LLC v. Sprint Spectrum, L.P.*, 849 F.3d 1360 (Fed. Cir. 2017). A settlement with a non-practicing entity might be “a major economic difference” compared to a hypothetical negotiation not involving a non-practicing entity. *Sprint*, 2015 WL 456154, *2. The context of the prior license must be analyzed, so that a

factfinder can assess whether a prior settlement agreement was affected by the coercive environment of patent litigation. *Baltimore Aircoil Co. v. SPX Cooling Technologies*, 2016 WL 4426681 (D. Md. Aug. 22, 2016). A “[s]ingle settlement on a different patent without any analysis of settlement context is not a reliable method for calculating damages.” *AVM Techs., LLC v. Intel Corp.*, 927 F. Supp. 2d 139, 144 (D. Del. 2013).

B. Apportionment In View of Comparable License Agreements

Armed with an understanding of the circumstances in which a prior agreement may be comparable, we now turn to a discussion of challenges associated with apportionment in view of those comparable agreements.

Parties in real-world licensing negotiations often base patent royalties on the entire revenue of multi-component products, even where the patented feature was not the basis for customer demand. Despite this real-world dynamic, where the royalty base in the prior comparable agreement was something larger than the SSPPU, some courts have required apportionment of the hypothetical negotiation royalty base. In such circumstances, the hypothetical negotiation apportioned royalty base may be multiplied by a royalty rate from a prior license, even though the prior license may apply that same royalty rate to a larger and unapportioned base. *See VirnetX*, 767 F.3d at 1329-31; *Lucent Technologies, Inc. v. Microsoft Corp.*, 2011 WL 7664416 (S.D. Cal. June 16, 2011) (requiring further apportionment of the royalty base, despite allowing reliance on historic licensing policies to inform the rate). Conversely, some experts have even been criticized for applying a rate derived from market licenses to an apportioned royalty base, where that rate was applied to an unapportioned royalty base in the prior agreement. *See Wisconsin Alumni Research Foundation v. Apple, Inc.*, 14-cv-062-wmc, 2015 WL 13547000, *16 (W.D. Wis. Sept. 30, 2015).

Some recent cases have recognized the economic reality that actual license agreements typically use entire revenues of multi-component products as the royalty base, even where it was undisputed that the patented feature was not the basis for customer demand. For example, in *Mondis Technology, Ltd. v. LG Electronics, Inc.*, the court noted that strictly applying the entire market value rule would “put Plaintiff in a tough position because on the one hand, the patented feature does not provide the basis for the customer demand, but on the other hand, the most reliable licenses are based on the entire value of the licensed products.” Nos. 2:07-cv-565 and 2:08-cv-478, 2011 WL 2417367, *2 at 3 (E.D. Tex. June 14, 2011).

The Federal Circuit addressed the relationship of the entire market value rule and the use of prior agreements in *Ericsson*, and recognized the economic reality identified in *Mondis*. The *Ericsson* court explained that the entire market value rule has two parts. *Id.* at 1226. First, there is a substantive legal rule that “the ultimate combination of royalty base and royalty rate” must be apportioned so that this combination reflects the value of the patented invention. “[I]t is the ‘value of what was taken’ that measures a ‘reasonable royalty’ under 35 U.S.C. § 284.” *Id.* “When the accused infringing products have both patented and unpatented features, measuring this value requires a determination of the value added by such features.” *Id.* Second, there is an evidentiary principle to avoid misleading the jury by “placing undue emphasis on the value of the entire product.” *Id.* at 1226-27. In *Ericsson*, the court found no legal error in admitting prior licenses “predicated on the value of a multi-component product” even though the technology being licensed related to only a component of that product. *Id.* at 1225. Trial testimony established the economic reality that licenses are “generally negotiated without consideration of the EMVR.” *Id.* at 1228. The court determined that it was not reversible error to admit such

licenses “where expert testimony explains to the jury the need to discount reliance on a given license to account only for the value attributed to the licensed technology.” *Id.*

Further, as noted earlier, in *CSIRO*, the Federal Circuit approved damages models that do not begin with a royalty base expressed as revenues multiplied by a royalty rate. In these cases, so long as the damages model derives from sufficiently comparable licenses, expert testimony advancing these theories may be admissible. In the wake of *CSIRO*, some district courts relaxed their application of the entire market value rule where prior agreements were relied on for determining reasonable royalty damages. For example, in *Intel Corp. v. Future Link Sys. LLC*, No. CV14-377-LPS, 2017 WL 2482881 (D. Del. June 1, 2017), the court allowed an expert to testify to his reasonable royalty opinion that included no apportionment of the royalty base and no application of the entire market value rule. Instead, the royalty opinion depended on comparisons to prior licenses. The court determined this methodology had been approved in *CSIRO*. *Id.* at *2.

Additionally, as described earlier, in *Exmark*, 879 F.3d 1332, the Federal Circuit again allowed a royalty base representing the entire accused product, based in part on a prior comparable agreement. The court noted that using the entire accused lawn mower as the royalty base “accurately reflects the real-world bargaining that occurs” and was consistent with a prior license relied on by the patentee’s expert. *Id.* at 1349.

Thus, the case law suggests that there is an issue as to how to apportion reasonable royalty damages especially when prior comparable agreements use as a royalty base something larger than the SSPPU. In such circumstances, there must be an analysis to determine whether the royalty base and/or the rate in the prior agreement needs to be adjusted to account for

“differences in the technologies and economic circumstances of the contracting parties.” *CSIRO*, 809 F.3d at 1303.

IV. POINT/COUNTERPOINT ON APPORTIONMENT

The principles set out above provide useful guideposts. But there is by no means unanimity as to how these principles should be applied in individual cases. Many fact patterns produce vehement and sincere opposing arguments as to the proper methodology for apportioning damages to ensure the patentee is receiving all that it is owed, but no more. Below, we have outlined arguments that may, in cases where the facts support them, be deployed in favor of either greater or lesser apportionment in appropriate cases.

Unlike the rest of this paper, the arguments in this Section IV are intended to be advocacy. Rather than neutrally convey points of law or economic analysis, in this Section, we outline arguments that an advocate or expert may use to support an analysis for a larger or smaller royalty base, respectively.

A. Arguments in Favor of Larger Royalty Bases

In some cases, such as *CSIRO* and *Exmark*, courts have found that it may be appropriate to use the entire value of an accused multi-component device as the royalty base in determining the appropriate payment for the use made of the asserted patent by the infringer. There are good legal and economic reasons for doing so. The law provides ample support when the patent claim covers the entire device or when the value of real-world license agreements are based on the total device. In addition, economic literature also supports the use of an entire multi-component device as the royalty base, due to such considerations as synergies and cognitive bias.

1. Patent Claim Covers the Whole Device

Many patent claims describe an entire multi-component device and, in those cases, there is support to argue that it may be appropriate to use the entire device as the royalty base. Use of

the entire device as the royalty base may be particularly appropriate for inventions that are intelligible only in the context of being included in a particular product. For example, in *Exmark*, the innovation related to a portion of a lawn mower (namely, the baffle) but the claims were directed to the entire lawn mower. As the Federal Circuit pointed out, the “preamble of claim 1 recites a ‘multiblade lawn mower’”. The Court went on to say that “the patent makes clear that the patented improvement relates to the mower’s flow control baffle, which through its structure and orientation within the mower deck ... improves the quality of grass cut in a manner that distinguishes it from prior art.”³ In this instance, the baffle described as changing air flow has little meaning without mention of the lawnmower in which it operates. Other inventions may also have relatively little value outside of the context in which they are used. For instance, an intermittent windshield wiper has a value on an automobile, train or truck but may not have value in any other contexts.

In other words, in cases such as those described above, there is no legally or economically recognizable “gist” or “heart” of the invention. *Loctite Corp. v. Ultraseal Ltd.*, 781 F.2d 861,875 (Fed. Cir. 1985), overruled on other grounds by *Nobelpharma AB v. Implant Innovations, Inc.*, 141 F.3d 1059 (Fed. Cir. 1998). Where the invention can only be understood and valued in the context of the entire product, the contribution of the invention to the value of the overall product would likely influence the strength of the economic argument to use the entire device as the royalty base in determining the appropriate compensation for patent infringement.

³ The claim lists other components of the lawnmower, including a mower deck, a motor propelling the mower cutting blades and a motor rotating the blades, and the control baffle within the motor deck whose positioning and shape are the innovation.

2. In Many Cases, Comparable Licenses Will Cover Entire Devices

As discussed in detail in Section III, comparable licenses can often provide the best objective evidence of the value of a patented technology, or at least evidence that is insulated from the biases in valuations from retained experts and juries exposed to astoundingly high revenue and profit figures. Such “arm’s length licenses tend to reflect the fair market value of using the patented technology within products and services.” Layne-Farrar, Anne. "The Patent Damages Gap: An Economist's Review of US Patent Damages Apportionment Rules." (2017), p. 19. See also, *CSIRO*, 809 F.3d at 1302-04. As discussed above, many licenses are based on the value of the entire product and courts have acknowledged the appropriateness of considering real world license agreements with royalties based on revenues for the entire device , if compliance with the above discussed criteria for comparability are sufficiently documented or adjusted to reflect differences.

3. Downstream Value Created by the Technology at Issue

The SSPPU is often a component supplied at the upstream end of a value chain in which such components are sold to assemblers of intermediate products, eventually being incorporated into final products. Companies at different levels of the value chain capture different proportions of the value of the finished product. In the real world, patent licensing often takes place at a level within the value chain that is downstream from first sale of the SSPPU, often the final product. In such licensing, the owner of the patent receives some of the cumulative benefits (or synergies, discussed below) of its intellectual property. Thus, relying on industry standard practices has the additional benefit that the reasonable royalty will provide a market-based allocation of the proportion of the value of the multicomponent downstream product that should be allocated to the patent.

For example, in “the cellular communications industry, it is common practice to license at the device level (cellphones and base stations), rather than at either the chipset or cellular service provider levels. Royalties are typically calculated based on the selling prices of the licensed products, rather than as a percentage of the selling price of either chipsets or cellular service.” Sherry, Edward F., and David Teece, “On the ‘Smallest Saleable Patent Practicing Unit’ Doctrine: An Economic and Public Policy Analysis” (2016), p. 11, citing Stasik, E., “Royalty Rates and Licensing Strategies for Essential Patents on LTE (4G) Telecommunications Standards,” *Les Nouvelles* (September 2010), 114–119. It may be argued that patent damages should reflect industry practice in this regard to ensure that patent owners recover the full economic value of their invention.

4. Methodology Concerns in Apportioning To or Below the SSPPU

Courts have acknowledged that the determination of damages need not be exact, but the determination must be sufficiently tied to accurate information to be evaluated as reasonable and reliable. *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1315 (Fed. Cir. 2014), overruled on other grounds by *Williamson v. Citrix Online, LLC*, 792 F.3d 1339 (Fed. Cir. 2015). *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 119 S. Ct. 1167, 143 L. Ed. 2d 238 (1999) at 150 . Requiring apportionment to the smallest saleable component, or even the product feature, in which the technology of the asserted patent is expressed, may introduce error or inability to demonstrate the reasonableness of the allocation conclusion. For example, a microprocessor may have a circuitry that accelerates mathematical calculations, another that conditions power use, and another that controls interactions with peripheral chips. Only some of these capabilities may infringe the patent in suit. The court in *Intelligent Verification Systems*, for instance, made exactly that point. *Intelligent Verification Systems, LLC v. Microsoft Corp.*, No. 2: 12-cv-525 (E.D. Va. Mar. 24, 2015). However, absent a market price for these features within the

microprocessor, identification of a methodology for determining a value that makes economic sense in a rigorous and principled way will often be difficult, if not impossible.⁴

Some economists have identified instances in which efforts to apportion beyond a salable component has required ad hoc apportionment criteria that are unrelated to the actual value or contribution of the patented technology. Some of the apportionment will be of no more relevance than arbitrary accounting rules used to allocate common costs, such as company overhead, to different operating divisions. Bailey, Elizabeth M., Gregory K. Leonard, and Mario A. Lopez, "Making Sense of "Apportionment" in Patent Damages." *Colum. Sci. & Tech. L. Rev.* 12 (2011): 255, referencing Baumol, William J., "On the Proper Costs Tests for National Monopoly in Multiproduct Industry," 67 *Am. Econ. Rev.* 809-822 (1977). The requirement for reliability may be better served by using as the royalty base a component that is actually salable, for which there is a market-derived value, and then calculating the portion of that value contributed by the patented technology. Several recent cases, discussed below, provide examples of various methodologies used in efforts to comply with requirements for apportionment that raise issues of the appropriateness and/or reliability of such apportionment efforts.

For example, in *SUMMIT 6, LLC v. Samsung Electronics Co.*, 802 F.3d 1283 (Fed. Cir. 2015), the patented technology related to the resizing of photographs taken with a smartphone camera and then shared. Plaintiff's expert determined the royalty on the basis of the relative frequency of the feature's use and the costs of the camera components. *Id.* at 1297. However, neither the cost of a patent practicing component (as opposed to its price) nor the frequency with which a patented feature is used are necessarily reliable inputs to patent valuation.

⁴ One could, for instance, compare the profits from selling the product with and without the patented feature if such data is available. Alternatively, the expert could undertake a conjoint survey that would extract the value of the patented feature.

Some experts have relied on conjoint surveys in an attempt to isolate the value of a patented feature from the entire device. For example, Apple's expert in *Apple v. Samsung* used a conjoint survey to isolate the value of the patented invention from the value of the entire smartphone. *Apple, Inc. v. Samsung Elecs. Co.*, 909 F. Supp. 2d 1147, 1156 (N.D. Cal. 2012). That metric, however, only captures one side of the story: the consumer demand. Willingness to pay measures the benefit of patented technology as perceived by consumers without taking into account the cost of providing the features and the competitive setting. Greg M. Allenby, Jeff Brazell, John R. Howell, and Peter E. Rossi, "Valuation of Patented Product Features" *Journal of Law and Economics*, Vol. 57, No. 3 (August 2014), pp. 629-663, <http://www.jstor.org/stable/10.1086/677071>. Conjoint surveys have to be designed to properly calculate the willingness to pay for a patented feature (relative to unpatented features) and their results need to be adjusted for the impact of costs and competition. *Visteon Glob. Techs., Inc. v. Garmin Int'l, Inc.* Case No. 10-cv-10578 (E.D. Mich. Oct. 14, 2016), <https://casetext.com/case/visteon-global-techs-inc-v-garmin-intl-inc-5>

Another expert in *Apple v. Samsung* used consumer reviews of the infringing products and counted the percentage of sentences in which the allegedly infringing features were mentioned. Without supporting analysis of the connection between reviews and value measures, this method may not provide sufficient rigor to be considered reliable.

5. Using the Entire Device as the Royalty Base Appropriately Accounts for Synergies

Although seldom cited by courts in determining the appropriate royalty base, economic literature suggests that synergies may support the use of a larger royalty base that better reflects the economic contribution of the technology at issue than would the SSPPU.

Synergies arise when the value of a combination of two components is greater than the sum of the values of the two components separately. Bailey, Elizabeth M., Gregory K. Leonard, and Mario A. Lopez, "Making Sense of “Apportionment” in Patent Damages." *Colum. Sci. & Tech. L. Rev.* 12 (2011): 255[12]. A frequently cited example of synergies is the addition of a camera to a smartphone. Adding the camera “increases the range of ways that the owner can make use of the smartphone; the owner can now take photos and share them with others over cellular connections in a way that the owner of a camera-less smartphone cannot. This increases the value to the owner of having cellular connectivity. *See generally* Sherry, Edward F., and David Teece, "On the 'Smallest Saleable Patent Practicing Unit' Doctrine: An Economic and Public Policy Analysis." Tusher Center for the Management of Intellectual Capital, (2016) (“Sherry & Teece”).

One way for the owner of a patent on chipset technology that controls the phone camera to capture the synergies in the above example is for the royalty to be based on the value of the camera-smartphone combination. Restricting “the royalty base to a narrow component, like the chipset, is likely to bias the damages calculation downward whenever synergies are present. Chipset revenues will not reflect the enhanced value the smartphone maker may receive through the combination of the patented technology with the other features that it affects.” Layne-Farrar, Anne, "The Practicalities and Pitfalls of the Smallest Saleable Patent Practicing Unit Doctrine: A Review of Teece and Sherry." (2016). p. 237.

Similar to the need for considerations of synergies is the situation in which a single component of a multi-component product may enable other components or other features of the entire product. According to some economists, “[I]f the component at issue enables other components, then limiting the royalty base to the individual component it reads directly upon is

too restrictive.” Damien Geradin and Anne Layne-Farrar, Patent Value Apportionment Rules for Complex, Multi-Patent Products, 27 Santa Clara High Tech. L.J. 763, 775 (2010). Available at: <http://digitalcommons.law.scu.edu/chtlj/vol27/iss4/3>. For example, it may be proposed by an expert that a smartphone’s sleek design that contributed to its popularity “was only possible given a small sized battery and low profile chipsets inside the phone.” Id. pp. 775-776. In such a scenario, a cell phone battery, having a market price of \$20, may enhance the value of a phone selling for hundreds of dollars well in excess of \$20.

6. Using the SSPPU Creates Cognitive Bias

Economists may consider the concepts of anchoring and framing in assessing any downward distortion that may arise from limiting the royalty base to a component of the entire device. Such downward distortion may be found to impair the reasonableness and reliability of the damages determination.

Anchoring refers to the tendency of people to allow estimates to be affected by initial estimates or the starting point of the calculation. See generally Damien Geradin and Anne Layne-Farrar, Patent Value Apportionment Rules for Complex, Multi-Patent Products, 27 Santa Clara High Tech. L.J. 763 (2010). Available at: <http://digitalcommons.law.scu.edu/chtlj/vol27/iss4/3>; Tversky, Amos, and Daniel Kahneman, "Judgment under uncertainty: Heuristics and biases." Science 185, no. 4157 (1974): 1124-1131; Kahneman, Daniel, and Vernon Smith, "Foundations of behavioral and experimental economics." Nobel Prize in Economics Documents 1 (2002).

The concepts of anchoring and framing can be demonstrated by considering two experiments where survey subjects are asked to estimate the product of $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8$. These survey subjects give a much lower estimate than those who are asked to estimate $8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$. The survey subjects were high school students who were asked to

make the estimate in five seconds. The researchers' conclusion was that if the initial term in a percentage calculation is low (as in the price of the SSPPU) then the estimate of product (or the appropriate reasonable royalty award) will also be low. From these results, commentators conclude that "framing and anchoring can work to either increase or decrease an individual's damages determination." Layne-Farrar, Anne, The Practicalities and Pitfalls of the Smallest Saleable Patent Practicing Unit Doctrine: A Review of Teece and Sherry (December 2, 2016). *les Nouvelles - Journal of the Licensing Executives Society*, Volume LI No. 4, December 2016. Available at SSRN: <https://ssrn.com/abstract=2855148>. P. 235. [16]

Because of the possibility of upward or downward distortion due to anchoring and framing, some economists have proposed that "courts should carefully choose *which* frame to use in any given patent damages matter, a question that needs to be addressed on a case-by-case basis." *Id.*

7. Uniform Pricing of the Smallest Salable Unit Eliminates Recovery of High Valued Use

As noted above, real world patent licensing in many industries takes place at the end user device level, downstream from components that may constitute the SSPPU. Accordingly, component makers in such industries typically do not pay royalties to patent owners, and thus do not account for royalty payments in determining their selling prices. An SSPPU royalty base that effectively sets a ceiling on a royalty base at the price of commodified components would not adequately capture the value that ultimately accrues to end users from use of the patented technology.

Further, in competitive markets, the law of one price dictates that the market price of an SSPPU is determined by the lowest-valued use of the smallest salable unit. Consider an OEM who incorporates a patent-practicing component into a high-end, high margin product but pays

the same price for that component as an OEM of an inexpensive product. The statutory basis for a reasonable royalty states that a reasonable royalty must be at least high enough to compensate for “the use made of the invention by the *infringer*.” Calculating a royalty on the basis of the market price of the patent practicing component, however, results in a reasonable royalty that is based on the lowest-valued use, even for the high-end infringer’s use. Such a royalty can drastically undercompensate owners of general purpose technologies. Gautier, Axel and Petit, Nicolas, Smallest Salable Patent Practicing Unit and Component Licensing - Why 1\$ is Not 1\$ (April 18, 2017). pp. 24-25. Available at SSRN: <https://ssrn.com/abstract=2954592> or <http://dx.doi.org/10.2139/ssrn.2954592>

B. Arguments in Favor of Smaller Royalty Bases

Ample support also exists for parties arguing in favor of smaller royalty bases, both legally and economically. Arguments that a party in this situation might deploy are outlined below.

1. The Law, Supported By Powerful Policy Considerations, Requires Using the SSPPU

When the patented feature of a multi-feature device does not drive consumer demand, the royalty base must be the SSPPU. As the Federal Circuit has recognized, “[w]here small elements of multi-component products are accused of infringement, calculating a royalty on the entire product carries a considerable risk that the patentee will be improperly compensated for non-infringing components of that product.” *LaserDynamics.*, 694 F.3d at 67. Therefore, the general rule is that royalties will be based on the “smallest salable patent-practicing unit.” *Id.* (quoting *Cornell Univ. v. Hewlett-Packard Co.*, 609 F.Supp.2d 279, 283, 287-88 (N.D.N.Y. 2009)).

While the entire market value rule is an exception to this general rule, the EMVR is very difficult to satisfy. *See id.* Specifically, as discussed above, a patentee may rely on the entire market value of the accused product if, *and only if*, the patentee demonstrates that “the patented feature creates the ‘basis for customer demand’ or ‘substantially create[s] the value of the component parts.’” *Uniloc*, 632 F.3d at 1318 (quoting *Lucent*, 580 F.3d at 1336). The Federal Circuit has emphasized that this test can only be met by showing that the patented feature *alone* causes customers to purchase the accused products. *LaserDynamics*, 694 F.3d at 68 (“It is not enough to merely show that the [patented feature] is viewed as valuable, important, or even essential . . . [P]roof that consumers would not want a laptop without [its many] features is not tantamount to proof that any of those features alone drives the market for laptop computers.”).

In fact, the Federal Circuit recently held that

when the product contains multiple valuable features, it is not enough to merely show that the patented feature is viewed as essential, that a product would not be commercially viable without the patented feature, or that consumers would not purchase the product without the patented feature. When the product contains other valuable features, the patentee must prove that those other features do not cause consumers to purchase the product.

Power Integrations, 904 F.3d at 965 (internal citations omitted).

Moreover, using the SSPPU instead of the entire product as the royalty base prevents the patent owner from collecting a royalty on the infringing product’s unpatented features and reduces the likelihood that a larger royalty base would bias the jury towards a larger damages award. *CSIRO*, 809 F.3d at 1302; *Ericsson*, 773 F.3d at 1226; *Uniloc.*, 632 F.3d at 1320 (disclosure of the end product’s total revenue “cannot help but skew the damages horizon for the jury, regardless of the contribution of the patented component to this revenue.”).

Therefore, to further the spirit of the statutory grant of “damages adequate to compensate for the infringement” under 35 U.S.C. § 284, the royalty base should be the SSPPU. Allowing

the royalty base to be anything more than the SSPPU when the patented feature does not drive consumer demand would lead to compensation for non-infringing activities.

2. Reliance on Components Larger than the SSPPU is Prejudicial

Big numbers sway juries. The Federal Circuit unambiguously recognized this fact in case after case. “The disclosure that a company has made \$19 billion dollars in revenue from an infringing product cannot help but skew the damages horizon for the jury, regardless of the contribution of the patented component to this revenue.” *Uniloc*, 632 F.3d at 132. As a result, Supreme Court and Federal Circuit “precedents do not allow consideration of the entire market value of accused products for minor patent improvements simply by asserting a low enough royalty rate.” *Id.*; *LaserDynamics*, 694 F.3d at 67-68.

Anchoring can be a serious concern. Consistent with the work of Tversky and Kahneman, two of the leaders of the behavioral economics movement, there is experimental evidence that jury awards increase with higher dollar requests made by plaintiff attorneys, and that this effect cannot be overcome by contrary evidence presented by defendants. Tversky, Amos, and Daniel Kahneman, "Judgment under uncertainty: Heuristics and biases." *Science* 185, no. 4157 (1974): 1124-1131; Chapman, Gretchen B., and Brian H. Bornstein, "The more you ask for, the more you get: Anchoring in personal injury verdicts." *Applied cognitive psychology* 10, no. 6 (1996): 519-540. Campbell, John, Bernard Chao, Christopher Robertson, and David V. Yokum. "Countering the Plaintiff's Anchor: Jury Simulations to Evaluate Damages Arguments." *Iowa L. Rev.* 101 (2015): 543. (“The plaintiff was able to dramatically increase its potential recovery by simply demanding more money. In our experiment, damages (when awarded) increased by an average of 823% for individual jurors and 430% in the jury simulation. A large royalty base might be used to lend credibility to an otherwise facially absurd damages award. For example, a damages expert might seek \$100 million in damages, where sales of the accused

chip were only \$50 million, by arguing that \$100 million is only a fraction of the \$1 billion in sales recognized by the manufacturer of the smartphone incorporating the accused chip. An unwavering requirement that the royalty base must correspond to the SSPPU, or to smaller units, avoids such misleading, but potentially appealing, arguments.

3. *Exmark* Does Not Signal an Erosion of the Rule Requiring Use of the SSPPU

In *Exmark*, a panel of the Federal Circuit did affirm the use of an entire accused lawnmower as a royalty base, where only one component, the baffle, was novel. The Federal Circuit did so without citing the “important evidentiary principle” described above. *See Ericsson*, 773 F.3d at 1226. Nowhere did the Federal Circuit acknowledge its precedents precluding introduction of a royalty base untethered to the footprint of the invention. Because an appellate court panel cannot overrule precedent set by prior panels, there is doubt as to what aspects of the *Exmark* decision hold binding weight.

In *Exmark*, the claim itself was drafted to cover the entire lawnmower. Thus, *Exmark* is arguably distinguishable from prior case law involving claims covering only one component of a multi-component accused product. But this distinction would eviscerate the policy behind *Uniloc* and *LaserDynamics*. It would make no sense to have a rule whereby a patent drafter could easily avoid the rule of *Uniloc* and *LaserDynamics*, simply by drafting claims to larger devices that include allegedly novel components. If these cases have any substantive meaning, it must be that the royalty *base* itself must bear a rational relationship to the value of the patented technology.

Exmark can be harmonized with the earlier case law. In so doing, one should keep in mind that the limitation on the base is at least in part an evidentiary rule rather than a substantive one. Although economic considerations do support the use of the SSPPU as the royalty base (as

explained in the next section), at the end of the day, what the *substantive* law requires is that the ultimate damages award be tied to the footprint of the invention. The *evidentiary* requirement that the base bear a relationship to the value of the patented technology is intended to avoid biasing the jury so they reach a legally supportable ultimate result. Ultimately, *Exmark*, a panel opinion, did not and could not overrule prior precedent. If there were any doubt on this score, the Federal Circuit's *Power Integrations* decision, decided only months after *Exmark*, dispels them. There, without so much as acknowledging *Exmark*, the Federal Circuit reiterated "that, where multi-component products are accused of infringement, the royalty base should not be larger than the smallest salable unit embodying the patented invention. . . . Even when a damages theory relies on the smallest salable unit as the basis for calculating the royalty, the patentee must estimate what portion of that smallest salable unit is attributable to the patented technology when the smallest salable unit itself contains several non-infringing features." *Power Integrations*, 2018 WL 4501536, at *8.

How can one apply *Exmark* in a way that appropriately respects the policy behind *Uniloc* and *LaserDynamics*? Several possibilities present themselves. First, in some cases, a court might require the parties to present royalties to the jury in terms of a per-unit royalty. This could be accomplished through a motion in limine. Thus, the experts' underlying analysis may, consistent with *Exmark*, rely on revenues attributable to the smallest salable patent-practicing unit, even when that unit largely includes conventional technology. But, when presenting to the jury, the experts may be ordered to present their opinions in terms of a per-unit royalty. If needed in the particular case, they might be permitted to disclose to the jury that they derived the per-unit figure by multiplying a rate by a base based on revenues and dividing by the number of units at issue, without disclosing the rate and the revenue base. This could avoid jury confusion

arising out of disclosure of a royalty base that is disproportionate to the patentee's inventive contribution.

Second, *Exmark* did not specifically discuss the question of evidentiary prejudice, and one may therefore reasonably infer that such prejudice was not an issue raised by the parties in this case. In a case in which evidentiary prejudice is an issue, a court might reasonably reach a result that differs from that in *Exmark*, and conclude that an expert must be required to apportion the base even below the level of the smallest salable unit, to a component that more closely approximates the actual inventive features of the claimed invention.

Third, nothing in *Exmark* precludes an expert from voluntarily using as a royalty base a component smaller than the SSPPU. In a case in which patent claims of differing scopes is at issue, in many instances, the only practical solution will require experts to use, as the royalty base, a component commensurate in scope with the broadest claim—which will be the smallest component. To illustrate this, consider a patent lawsuit with three claims at issue:

1. A chair comprising a novel seat and a first leg.
2. The chair of claim 1 further comprising a second leg and a third leg.
3. The chair of claim 2 further comprising a back.

The SSPPU corresponding to claim 1 is the chair with a novel seat and single leg; while the SSPPU corresponding to claim 3 is the chair with the novel seat, three legs and a back. An expert's task would be unmanageable if she had to present three damages theories with three different bases and three different rates. Rather, as a practical matter, the expert may properly choose to select the seat-and-leg chair as the royalty base, even though that component is smaller than the SSPPU of claims 2 and 3. This practical solution also may mitigate the evidentiary

prejudice of selecting as a royalty base a product with multiple conventional components (legs and a back) whose value is unrelated to the patented technology.

One further observation about *Exmark* is in order. The case provided a critical reminder to parties that rigorous apportionment and analysis in the *rate* is equally important to a proper result. Thus, the entire line of cases, read as a coherent whole, stand for two complementary propositions: (1) Reasonable royalty damages should be carefully tailored in a manner commensurate with the footprint of the invention; and (2) where evidentiary prejudice is a concern, special attention should be paid to ensuring that the royalty *base* is not itself out of proportion with the scope of the invention. Through careful analysis, a party and its expert may satisfy both of these goals and present a well-supported and balanced argument to the factfinder.

4. In Appropriate Cases, the Royalty Base Should Be Smaller Than the SSPPU

In multi-feature SSPPUs, where only one feature is patented, the royalty base should be apportioned down from the cost of the SSPPU to reflect the value of the SSPPU that is attributable to the patented feature. *VirnetX*, 767 F.3d at 1327-28. This approach to calculating patent damages is consistent with Supreme Court precedent. In *Garretson v. Clark*, the Supreme Court instructed that “[the patentee] must separate [the patented improvement’s] results distinctly from those of the other parts, so that the benefits derived from it may be distinctly seen and appreciated.” 111 U.S. 120 at 121 (1884). Mirroring the Supreme Court’s instruction, the Federal Circuit has advised that patent damages “must reflect the value attributable to the infringing features of the product, and no more.” *Ericsson*, 773 F.3d at 1226 (Fed. Cir. 2014).

This principle was recently addressed and reaffirmed by the Federal Circuit. In *Finjan, Inc. v. Blue Coat Sys.*, the Federal Circuit remanded a case for failure to properly apportion a royalty base that included patented and unpatented features. 879 F.3d 1299. The asserted patent

in *Finjan* related to virus detection software and creating a security profile for web addresses. *Id.* at 1303-04. Finjan accused Blue Coat’s “dynamic real-time rating engine,” or DRTR, of infringing its patent and used the DRTR, which included patented and unpatented features, as the royalty base for calculating damages. *Id.* The Federal Circuit recognized that the DRTR was the SSPPU, but found that Finjan failed to properly apportion the damages base. Explaining its holding, the Federal Circuit stated that,

because DRTR is itself a multi-component software engine that includes non-infringing features, the percentage of web traffic handled by DRTR is not a proxy for the incremental value of the patented technology to WebPulse as a whole. *Further apportionment was required to reflect the value of the patented technology compared to the value of the unpatented elements.*

Id. at 1311.

When determining the proper royalty base, it is important to remember that apportioning to the SSPPU may not be sufficient. A careful analysis must be conducted to determine the value of the patented features. And, it is that value that should be used as the royalty base.

5. Economic Considerations Support the Use of the SSPPU or Smaller

a. There Is No Principled Way to Apportion Among Components or Subsystems That Purportedly Create Synergies

Some argue that it is appropriate to use a royalty base corresponding to a component larger than the SSPPU because such a royalty base accounts for synergies created by the patented technology with respect to the larger component into which it is integrated. This argument misses the mark. There is no objective manner to allocate synergies among the contributors to those synergies. There is no way, for example, in the “sleek design” of the smartphone example cited above, to weight the relative value of the contribution of the efficient battery or the low profile chips. “Any ... rule to apportion the synergies between the assets is necessarily arbitrary.” Bailey, Elizabeth M., Gregory K. Leonard, and Mario A. Lopez, "Making Sense of “Apportionment” in

Patent Damages." Colum. Sci. & Tech. L. Rev. 12 (2011): 261. Any allocation is going to require the use of rules-of-thumb with no sound or rigorous economic basis. As critics of the SSPPU themselves admit, while it is "easy to assert there are synergies between different features, [it is] ... difficult to quantify them. ... in practice, one may need to resort to simple, easy-to-administer rules (e.g., percentage-based royalties), relying on the parties to negotiate (or the court to select) a single rate that 'smooths out' individuated variations to yield a "blended" rate that is mutually agreeable and (overall, on average) 'right.'" Sherry, Edward F., and David Teece, "On the 'Smallest Saleable Patent Practicing Unit' Doctrine: An Economic and Public Policy Analysis." (2016), p. 18. Such rules of thumb are generally no longer permissible in calculating monetary remedies in patent cases.

It can also be difficult to undertake the basic step of enumerating all the IP that contribute to the synergies that enhance the value of a product. Often there will be many sources of IP that interact to provide the synergies that multiplicatively add value to a product attribute. Again, a popular smartphone's sleek design, cited above, was also likely partially attributable not only to chip layout and battery technology, but also to touchscreen technology and antenna technology. If all factors that contribute to the value of a multicomponent product are not completely enumerated, the apportionment of value to the patent at issue will tend to be biased upward, absorbing some of the value appropriately attributable to the ignored factors.

b. Using the value of the entire product can result in unrealistically high royalties as a percentage of the value of the component that incorporates the IP.

Using the entire market value of a multicomponent product as the royalty base may result in a purportedly reasonable royalty that is a small number compared to the royalty base but a very high portion of, or greater than, the price of the SSPPU. The manufacturer of the SSPPU facing such a royalty would, of course, have attempted to pass a royalty onto its customers in the

form of an increased price. A significant price increase will generally result in lower demand for the SSPPU or outright replacement of the patented technology incorporated into the SSPPU.

The operation of “the law of demand” will generally have an impact on the outcome of a hypothetical negotiation and experts must take that into account. In *Monolithic Power Systems Inc. v. O2 Micro Intern. Ltd.*, 476 F. Supp. 2d 1143 (N.D. Cal. 2007), plaintiff’s expert assessed a reasonable royalty for an electric power conditioning chip that was used in computer notebooks. The chip sold for less than \$5.00. The expert calculated the royalty as a percentage “of the average retail price of a notebook computer,” which resulted in “a royalty that would triple the average selling price for [defendant’s] accused products.” *Id.* at 1155. He made “no allowance for the impact that increased prices would have had on demand” due to customers switching to a non-infringing alternative. *Id.* at 1156. The court granted summary judgement in favor of defendants on damages on the basis of this deficiency.

It is certainly possible that demand is perfectly “inelastic,” meaning that, in this case, a manufacturer will not be able to switch technologies in response to a change in the relative prices of different technologies or components.⁵ As *Monolithic* and other cases make clear, however, perfectly inelastic demand cannot merely be assumed. A hypothetical negotiation modelled on the basis of the value of the SSPPU will generally more accurately predict an outcome that reflects the impact of downward sloping demand functions. Relatively or totally inelastic demand functions appear to be assumed in some of the commentary supporting the use of the entire value of the final product as a royalty base. An example is the hypothetical case put forward by Nicolas Petit. Petit, Nicolas, “The Smallest Salable Patent-Practicing Unit (‘SSPPU’) Experiment, General Purpose Technologies and the Coase Theorem.” (2016); *see also* Cotter,

⁵ This point is made in Gregory Sidak, J. “The Meaning of FRAND, Part II: Injunctions.” *Journal of Competition Law and Economics* 11, no. 1 (2015): 201-269, note 76 and accompanying text. Sidak is discussing standard essential patents but the point has wider applicability to situations where a manufacturer is “locked-in.”

Thomas F. "Patent Damages Heuristics." *Tex. Intell. Prop. LJ* 25 (2017): 159, citing Stern, Richard H., "What Are Reasonable and Non-Discriminatory Terms for Licensing a Standard-Essential Patent?" *Eur. Intell. Prop. Rev.* 37 (2015): 549-554, and Layne-Farrar, Anne, "The Patent Damages Gap: An Economist's Review of US Patent Damages Apportionment Rules." (2017). Petit cites a conjectural case in which heavy electrical wiring in an airplane is replaced by a patented system that comports to a radio standard, the Wireless Avionics IntraCommunications (WAIC) standard. Such a replacement would save airplane operators over \$3 million per aircraft in reduced fuel costs. The cost of such a system (that is the cost of the SSPPU) would be in the thousands of dollars. Limiting the royalty base to the SSPPU would, it is alleged, therefore under-reward the owner of the innovative technology.

Such a conclusion ignores the operations of a reasonably competitive market, even one constrained by the implementation of a standard. In the real world, the opportunity to make huge returns of the sort hypothesized by Petit would result in enthusiastic investment in inventions that will provide competitive alternatives to the standard or some other way to reduce wiring on an airplane. Of course, the owners of the WAIC technology would understand that there was such a competitive threat and license at a rate sufficiently low to reasonably assure that no such entry took place.

V. CONCLUSION

Despite the length of this paper, we have only scratched the surface of many of the subjects touched upon. We have presented multiple views on questions of apportionment, but innumerable further arguments may exist on both sides, particularly in view of the particular facts of any given case.

In addition, this paper focuses exclusively on U.S. law, while patent damages regimes in other countries can differ significantly. For example, we have not addressed whether

considerations like SSPPU may gain acceptance outside the U.S. Moreover, other jurisdictions in which jury trials are unavailable may be unlikely to adopt aspects of the U.S. jurisprudence, many of which are directed to preventing prejudicial evidence from reaching unsophisticated juries. Further, we have not attempted to address apportionment in the context of standards-essential patents, where other considerations may arise.

We hope that this white paper forms the core for productive future discussions, and that it plays a role in the evolution of the law in a way that promotes innovation and discovery.